This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 431663 DUPL

THE UNITED STATES
INDUSTRIAL COMMISSION,
WASHINGTON, D. C.

S
81
.A3

Compliments of

GEO. B. ELLIS,

Secretary State Board of Agriculture.

D. 07.

THE UNITED STATES
INDUSTRIAL COMMISSION,
WASHINGTON, D. C.

S
81
.A3

HON. NORMAN J. COLMAN,

President Missouri State Fair, First U. S. Secretary of Agriculture,
Member of State Board of Agriculture since 1867.

HON. NORMAN J. COLMAN,

President Missouri State Fair, First U. S. Secretary of Agriculture,
Member of State Board of Agriculture since 1867.

W. R. WILKINSON,
St. Louis, Mo.,
President State Board of Agriculture.

33rd ANNUAL REPORT

OF THE

MISSOURI

STATE BOARD OF AGRICULTURE

FOR THE

YEAR 1901.

JEFFERSON CITY, MO.,
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
1901.

D. 07.

OFFICERS STATE BOARD OF AGRICULTURE 1901.

President—W. R. Wilkinson, St. Louis.
Vice-President—C. P. Cook, Round Grove.
Secretary—Geo. B. Ellis, Appleton City.
Assistant Secretary—Snowdon Willis, Columbia.
Treasurer—H. H. Banks, Columbia.
Veterinarian—Dr. D. F. Luckey, Perryville.

EXECUTIVE COMMITTEE.

W. R. Wilkinson, St. Louis. D. A. Ely, Sublette.
C. P. Cook, Round Grove. Ferd J. Hess, Wolf Island.
H. J. Waters, Columbia.

EX-OFFICIO MEMBERS.

Governor of Missouri—A. M. Dockery.
Superintendent of Schools—W. T. Carrington.
Dean Agricultural College—H. J. Waters.

CORPORATE MEMBERS.

Name.	Postoffice	No. Dist.	Term Expires.
D. A. Ely	Sublette	1st	July, 1900
J. W. Hill	Chillicothe	2nd	July, 1902
Alex. Maitland	Richmond	3rd	July, 1902
Eugene Rhoades	Fairfax	4th	July, 1900
J. F. Groves	Corder	5th	July, 1902
*———		6th	
N. H. Gentry	Sedalia	7th	July, 1900
L. F. Luthy	Lebanon	8th	July, 1903
J. A. Potts	Mexico	9th	July, 1901
T. B. North	Grays Summit	10th	July, 1901
N. J. Colman	St. Louis	11th	July, 1901
W. R. Wilkinson	St. Louis	12th	July, 1901
Chas. M. O'Connell	Fredericktown	13th	July, 1902
Ferd J. Hess	Wolf Island	14th	July, 1902
C. P. Cook	Round Grove	15th	July, 1900

* The vacancy in the 6th district caused by the resignation of Geo. B. Ellis, who was elected secretary.

172049

OFFICERS OF STATE FAIR DIRECTORY.

President—N. J. Colman, St. Louis.
Vice-President—N. H. Gentry, Sedalia.
Secretary—J. R. Rippey, Sedalia.
Treasurer—C. W. McAninch, Sedalia.

EXECUTIVE COMMITTEE STATE FAIR DIRECTORY.

N. J. Colman, St. Louis.
N. H. Gentry, Sedalia.
Alex. Maitland, Richmond.
W. T. Carrington, Jefferson City.
J. A. Potts, Mexico.
Thos. B. North, Grays Summit.

OFFICERS STATE HORTICULTURAL SOCIETY.

President—N. F. Murray, Oregon.
Vice-President—D. A. Robnett, Columbia.
Second Vice-President—Samuel Miller, Bluffton.
Secretary—L. A. Goodman, Kansas City.
Treasurer—A. Nelson, Lebanon.

OFFICERS STATE POULTRY ASSOCIATION.

President—Henry Steinmesch, St. Louis.
First Vice-President—Chas. Opel, Jefferson City.
Second Vice-President—Dr. J. T. Dewey, Keytesville.
Secretary—C. W. Nuss, Tina.
Treasurer—J. A. Maxwell, Fayette.

OFFICERS MISSOURI SWINE BREEDERS' ASSOCIATION.

President—J. W. Boles, Auxvasse.
Vice-President for Poland Chinas—J. T. Robinson, Bates City.
Vice-President for Chester Whites—J. W. Ketchem, Love Lake.
Vice-President for Duroc Jerseys—S. Y. Thornton, Blackwater.
Vice-President for Berkshires—June K. King, Marshall.
Secretary and Treasurer—F. H. Schooler, Rockport.

OFFICERS MISSOURI ROAD IMPROVEMENT ASSOCIATION.

President—Geo. F. Reed, Springfield.
Vice-President—W. L. Addy, Parnell City.
Secretary—G. W. Waters, Canton.

OFFICERS STATE SHEEP BREEDERS' ASSOCIATION.

President—N. J. Colman, St. Louis.
Secretary—L. E. Shattuck, Stanberry.

OFFICERS STATE HORSE BREEDERS' ASSOCIATION.

President—C. F. Clark, Mexico.
Secretary—J. R. Rippey, Sedalia.

OFFICERS IMPROVED LIVE-STOCK BREEDERS' ASSOCIATION.

President—N. H. Gentry, Sedalia.
Secretary—Geo. P. Bellows, Maryville.

OFFICERS MISSOURI STATE GRANGE.

Master—C. O. Raine, Monticello.
Lecturer—T. B. Dunham, New Cambria.
Overseer—W. B. Yocum, Warrenton.
Treasurer—W. P. Haines, Gilman City.
Secretary—E. H. Long, Monticello.

OFFICERS STATE DAIRY ASSOCIATION.

President—Norman J. Colman, St. Louis.
Secretary—Levi Chubbuck, Chemical Building, St. Louis.
Treasurer—J. L. Erwin, Steedman.

LETTER OF TRANSMITTAL.

STATE BOARD OF AGRICULTURE, OFFICE OF SECRETARY, COLUMBIA, Mo., March 15, 1901.

To His Excellency, Hon. A. M. Dockery, Governor of Missouri:

Sir:—I have the honor to transmit herewith a report of the work of the State Board of Agriculture for the year 1900, together with a number of interesting tables and valuable papers on topics of interest to the farmers and breeders of the State.

The progress of agriculture in our State in the past has been great, but may we not reasonably hope that the future will be much greater? The work of this Board has been hindered somewhat for lack of funds, but we believe and hope that with the improved condition of the revenues of Missouri on account of recent legislation, future Legislatures may be able to deal more liberally with the Board and our work may be broadened and brought into closer contact with the people of the State.

The development of the agricultural resources of the State means the improvement of every other industry within her borders, and the appropriations made by the Legislature to the Board of Agriculture, acting as it does in the capacity of an industrial agent, will eventually return to the Treasury in taxes on the increased resources of the State, several times the amount expended.

With the hope that our work in the interest of the farmers, fruit-growers, poultrymen, dairymen, live-stock breeders and others may meet with your hearty approval, I have the pleasure to remain,

Most respectfully yours,

GEO. B. ELLIS, Secretary.

TABLE OF CONTENTS.

Introductory 1
Report of Secretary 5
Financial Statement 85
Farmers' Institutes 49
Missouri Horse Breeders' Association 138
Institute Meeting of Missouri State Poultry Association 149
Missouri Improved Live Stock Breeders' Association 181
State Sheep Breeders' Association 239
Status Missouri Dairy Industry 308
Manufacturing and Marketing Farm Butter 311
The Dairy Herd 323
Feeding the Dairy Herd 329
Missouri State Dairy Association 338
The Missouri Agricultural College 371
Prize Essays 383
Live Stock Sanitary Regulations 394
Miscellaneous Tables 408-416

INTRODUCTORY.

It is with a deep sense of the importance of the work of the Board of Agriculture, and the responsibilities imposed on the Secretary that I assume the duties of this office. No other business or calling in life offers better opportunities for intelligent and well directed effort than does agriculture; but to simply "plow and to sow, to reap and to mow" is no longer considered intelligent farming. The farmers of our State are awake to the necessity of being informed along all the lines of their work and never before in the history of Missouri has there been such a demand for printed information giving the results of investigations made by the Board of Agriculture, and the Agricultural College and Experiment Station. The progress of every State that stands upon an agricultural basis and gives proper encouragement to that industry can be measured only by time itself.

The statutes of Missouri define the duties of the Secretary of the Board as being "to gather crop and stock statistics, meteorological data and information as to the best and most profitable means of farming, stock-raising, fruit-growing, etc., and publish the same in bulletins as frequently as may be deemed expedient, to hold farmers' institutes in different parts of the State for the purpose of giving instruction in agriculture, etc." While it may be said that a great deal of work has been done along all these lines, it can be greatly extended and much improved if the Legislature will provide the means and make more liberal appropriations for the work. Heretofore the Secretary has published each year six or seven crop bulletins and a number of other bulletins containing the proceedings of the State Industrial Associations, Missouri's natural resources, annual report, etc. The present year we will endeavor to publish a monthly bulletin, containing a crop report for the month and such other information as we may think of importance.

SPECIAL LINES OF WORK.

All the attention possible will be given this year to all branches of our agricultural industries, but owing to the special interest that is now being manifested and the importance of the same, special effort will be made this year to assist the State Superintendent of Schools to perfect and have put in force a practical system of teaching elementary agriculture in the rural schools, and to develop the poultry industry, the sheep industry and the dairy industry of the State. The development of any one of these special lines of work, we feel confident in saying, will amply repay the State for all the money expended by our Board.

ANNUAL REPORT.

In presenting this, the thirty-third annual report of the State Board of Agriculture, it is proper to say that a great deal of the material was found in the office when I took charge, the first of January. The Secretary's report, found in pages 5 to 48 inclusive had been prepared by my predecessor, Mr. J. R. Rippey, to whom I wish now to acknowledge my thanks for many courtesies shown. A number of papers have been cut down and a number of good ones left out for want of space.

MUTUAL INSURANCE AND AGRICULTURAL SOCIETIES.

In this volume we have departed from the former custom of printing separate reports for each of the Mutual Insurance Companies, and the County Agricultural Societies and the same may be found in convenient tables which we hope will meet the approval of our readers, as it is more convenient for reference and saves much valuable space.

STATE DAIRY ASSOCIATION.

We publish in part the proceedings of the State Dairy Association, held at Kansas City on December 20-22, 1900. Although not held under the auspices of this Board, the President of the Association, Governor Norman J. Colman, is a distinguished member of the Board, besides the importance of the work and its close relation to the work of the Board

of Agriculture is a sufficient reason for devoting the space to the report of this meeting.

FARMERS' INSTITUTES.

A farmers' institute is a farmers' school where the farmers meet and receive instruction from practical and scientific teachers on various subjects. We are spending millions of dollars annually in Missouri for the general education of our youth, and no one dare raise his voice against it, but are there not many reasons why the farmers who have not had the opportunity for special training in their work should be given the best opportunities possible to receive such instruction? There is no other industry in the State that will not soon feel the benefits received from an improved condition in agriculture.

We are pleased to note that the appropriation for institute work has been materially increased, and with the earnest help of the farmers themselves, we hope to be able to show flattering results from this work.

STATISTICAL TABLES.

While the law provides that we shall gather and publish agricultural statistics, it provides no machinery for collecting reliable data, and at the request of this office, the Hon. T. L. Harper, member of the House of Representatives from Bates county, introduced into the Legislature the following House Bill No. 462, which passed to engrossment without opposition; however for lack of time and the pressure of other business it did not become a law, but we sincerely hope that the next Legislature may enact something of a like nature upon this subject.

HOUSE BILL NO. 462.

An Act to provide for the collecting and publishing of agricultural statistics.

Be it enacted by the General Assembly of the State of Missouri, as follows:

SECTION 1. It shall be the duty of the assessors of the several counties, and the township assessor in counties having township organization in this State, in addition to the duties now required by law, annually at the time of making assessments of real and personal property, to require and take with each assessment list upon separate blanks to be provided as other blanks are now provided for, a statement from each individual, firm or corporation: the number of acres cultivated in the leading farm crops of the State, and the amount of each crop produced, and such statement of live-

stock, dairy products, poultry products and horticultural products, with prices of same, as shall be designated by the State Board of Agriculture. Said statement shall be for the preceding year.

SEC. 2. Said statement shall be returned by the assessors to the county clerks, who shall immediately forward the same to the Secretary of the Board of Agriculture at his office, who shall publish an aggregate statement of same in his annual report.

SEC. 3. It shall be the duty of the county clerk to furnish a sufficient number of blank forms to the assessor for taking the statistics required in section 1, of this article: Provided that the form of said blanks shall be furnished by the Secretary of the Board of Agriculture. Provided further that the county court shall allow the assessor a reasonable compensation for taking said statement, not to exceed two cents per list.

SEC. 4. By reason of the fact that the statements required by this Act are desired for the year 1901 creates an emergency within the meaning of the constitution; therefore, this Act shall be in force and take effect from and after its passage.

The above would necessitate very little extra expense, and the statements furnished would be accurate and furnish a reliable basis for crop and other estimates. If the farmers desire this information they should inform their representative.

CO-OPERATION.

The Board of Agriculture, the Agricultural College and the Experiment Station, are in hearty co-operation in the work of aiding the farmers to improve their condition, and we earnestly invite the assistance of every farmer and breeder in the State, to the end that we may place Missouri in the position to which she is pre-eminently entitled, on the topmost round of agricultural progress.

ASSISTANCE.

We desire to acknowledge the valuable assistance rendered in taking up this work, of H. J. Waters, Dean of the Agricultural College also of Miss S. B. Willis, Assistant Secretary and Miss Minnie Lee Blackwell, Veterinary Clerk.

Yours respectfully,

GEO. B. ELLIS, Secretary.

ANNUAL MEETING.

OFFICE OF SECRETARY,

Columbia, Mo., December 18, 1900.

State Board of Agriculture met in regular session. Members present, John W. Hill, President; D. A. Ely; Alex. Maitland; Eugene Rhoades; Geo. B. Ellis; N. H. Gentry; L. F. Luthy; J. A. Potts; Thos. B. North; N. J. Colman; W. R. Wilkinson; Chas. M. O'Connell; Ferd J. Hess; C. P. Cook; W. T. Carrington and H. J. Waters.

On motion the reading of the minutes was dispensed with and the minutes as printed in the thirty-second annual report were approved.

The following review of the Board's transactions for 1900 was reported by the Secretary, and on motion of Governor Colman was ordered printed in annual report:

REPORT OF SECRETARY.

Mr. President and Members of the State Board of Agriculture:

As an aid in the future to the successful discharge of the duties assigned you, a careful review of the Board's transactions and of its achievements during the past season may possibly be made with profit. Charged, as you are, under the provisions of the statute, with the expenditure of public funds for the promotion of the agricultural and live-stock interests of the State, interests upon which the prosperity of the people must always largely depend, it becomes necessary that you take advantage of any possible light that may be derived from the past and that may serve to direct you to wise and judicious conclusions in the future.

Confidence in your integrity and judgment has placed in your hands the enforcement of anti-butterine laws and the protection of the

dairy industry against unjust competition from deceitful imitation compounds, and the public against fraudulent sale of a bogus article.

Relying upon your knowledge of live-stock husbandry, the State Veterinary Service has been placed under your charge and you are authorized to formulate such regulations for promulgation by the Governor as will protect your herds against the introduction of contagious or infectious live-stock diseases and extirpate such as might exist in the State.

The management of the State Fair, an institution of inestimable importance to the great industries of the State, has been placed under your direction, and with the support you will no doubt receive from the General Assembly and through the exercise of your best judgment, should be a credit to the State, answer the purposes for which it was established and meet the expectations of the public.

These are mentioned only as a part of your duties, but indicating the magnitude and the importance of the services expected at your hands and the necessity for prudent action, and for such an organization of your Board as will best serve these purposes.

That your only remuneration, your only official emolument, is what may accrue to the citizen from your efforts, together with the satisfaction that comes from services faithfully performed, should not serve as a discouragement, nor to restrain your energy, nor to modify that scrupulous performance of duties that you would exercise in conducting your own personal affairs.

The expenditure of every dollar of public money should be so ordered as to bring the best possible results. Every interest intended to be protected or promoted should receive the full benefit of the fund appropriated for that purpose. Effective work to the extent of available means is the only sufficient and satisfactory answer to the responsibilities with which you are charged and is such an answer as the public will demand.

For your consideration, the following summary of the past year's work is submitted:

CROP CONDITIONS AND YIELDS FOR 1900.

Corn—Conditions for seeding were unusually favorable. The seed bed was in excellent condition, germination was prompt and the plant

vigorous. Fifty per cent of the crop was seeded by May 1, and practically all the remainder was planted the first half of May. On April 1, twenty per cent of last season's crop remained in the hands of the producer for maturing stock then in the feed lots and for the use of farm teams in making this season's crop.

The crop was well cultivated and the yield for the State would have been large had not drouth prevailed in localities.

The total acreage for the State is 6,400,000 acres, and the final estimate of the yield for the State made by sections and after cribbing was practically completed, is 193,267,000 bushels, against 183,000,000 for last season.

In the northeast section the acreage was unchanged, being placed at 926,000 acres and the yield per acre is estimated at 30 bushels; making a total yield for the section of 27,780,000 bushels.

In the northwest section the acreage was increased from 1,880,500 to 1,937,000, and the yield per acre is placed at 33 bushels against 37 for last season; making the estimated yield for this season 63,921,000, compared with 69,578,000 for 1899.

The central section declined in acreage from 1,076,000 to 1,055,000 acres, and the estimated yield per acre from 32 to 30 bushels and the total yield for the section from 34,430,000 to 31,650,000.

In the southwest section the acreage was increased from 1,644,000 to 1,677,000 acres, and the yield per acre from 20 to 28 bushels, and the total yield from 32,880,000 to 46,956,000 bushels.

In the southeast section the acreage was increased from 804,000 to 820,000 acres, the yield per acre from 25 to 28 bushels and the total for the section from 20,100,000 to 22,960,000 bushels.

Wheat—Acreage harvested was 1,000,000 acres against 900,000 acres harvested in 1899, and the yield per acre 16 bushels against 9 bushels last season, and the total yield 16,000,000 bushels against 8,100,000 bushels. The heaviest yield per acre (19 bushels) was reported from the northwest section, with 16 bushels for the northeast, 15 bushels for the southwest and 14 bushels each for the central and southeast.

The wheat acreage seeded this season is placed at 1,040,000 acres, an increase above 1899 of 40,000 acres. The only decrease was two per cent in the northeast section, while there was an increase of fourteen

per cent in the northwest, three per cent in the central, four per cent in the southwest and two per cent in the southeast. Conditions were generally favorable for preparation of seed bed and for seeding and the young plant has made an unusual growth. The present condition for the northwest section is placed at 101, the northeast at 100, the lowest being in the southwest where it is estimated at 89. The northwest and northeast sections report but little, if any, damage from the Hessian fly, while the remaining sections report slight damage from most localities and serious damage from others.

Oats—Acreage was increased 23 per cent in northeast section, thirteen per cent in the northwest, three per cent in central, one per cent in southwest and a decrease of two per cent in the southeast. The increase for the State was eight per cent, making the acreage approximately 1,000,000 acres. The yield was 30 bushels per acre against 27 bushels for last season and the total yield 30,000,000 bushels against 20,709,000.

Flax—Acreage was decreased to 60,000 acres against 63,500 for last season. The yield per acre is placed at 9 bushels, same as for 1899 and the total yield 540,000 bushels.

Meadows. (*Timothy*)—Acreage for the State was reduced from 2,360,000 acres in 1899 to 2,218,000 acres for this season and the yield from 1.5 tons per acre to 1.3 tons, and the total yield from 3,540,000 tons to 2,884,000 tons. This decrease in yield per acre is attributed largely to the severe drouth and ravages of grasshoppers during the preceding fall. Not only was the quantity decreased, but the quality of the product was impaired, being generally weedy and largely mixed with blue grass and red top.

Cotton—Acreage was increased by 33 per cent of that of 1899, giving an acreage of 64,200 acres. Sixty-five per cent of the crop was planted May 1, against 38 per cent for same date last season. The yield per acre of lint cotton was 273 pounds, while for 1899 it was 271 pounds. The total yield for the State was 35,053 bales against 26,095 bales for last season.

Tobacco—The acreage was slightly increased for this season and is now estimated at 10,100 acres, and the yield per acre is placed at 731 pounds against 758 for 1899.The yield for the State should be 7,585,000 pounds, while it was 7,580,000 for last season. The heaviest yield per

acre (850 pounds) is reported from the northeast section, and the lightest (650 pounds) from the southeast. The condition for setting plants was favorable, but unfavorable for cutting and curing.

Pastures have furnished an abundance of nutritious grass throughout the season, except in a few localities where drouthy conditions prevailed during August and September. But in all sections the abundant fall rains started a splendid growth, and farmers will generally go into winter with more than the usual supply of winter pasturage. Live stock has done well, has, as a rule, been free from contagious or infectious diseases, has made good gain on pasture and will be placed on winter feed in good condition, that the abundance of feed should sustain until the return of spring.

FARMERS' INSTITUTES.

On order of Executive Committee, June 4, Messrs. Wilkinson, North and Luthy were named as a committee to locate farmers' institutes in South Missouri, and Hill, Waters and Rippey those in North Missouri. On report of these two committees meetings were fixed at the following points and upon dates mentioned.

Location and date of meeting:

Laddonia ....August 20-21	Richmond .....September 7-8
Wellsville ....August 21-22	Lawson .....September 10-11
Big Creek Grange..August 22-23	Plattsburg .... September 11-12
Troy .... August 23-24	Sheridan ..... September 13-14
Winfield .....August 24-25	Gilman .....September 14-15
Lewiston ....August 27-28	Carthage .....September 17-18
Kahoka ....August 28-29	Neosho .....September 18-19
Memphis ..... .August 29-30	Pierce City.....September 19-20
Bucklin ....August 30-31	Lebanon.....September 20-21
Mendon .....August 31, Sept. 1	Richland ..... September 21-22
Wheeling ..... September 3-4	Hobson.....September 24-25
Breckenridge ..... September 4-5	Washington ....September 25-26
Cameron .....September 5-6	Farmington ....September 26-27
Kearney ....September 6-7	Perryville .....September 28-29

Jackson .....October 1-2	Mountain Grove....October 9-10
Charleston .....October 3-4	Seymour .....October 10-11
Neeleyville ..... October 4-5	Greenfield ..... October 11-12
Birch Tree .....October 5-6	Humansville .....October 12-13
Willow Springs.....October 8-9	

At the meeting in May, the Secretary was informally instructed to correspond with Col. G. W. Waters, of Canton, Dr. J. L. Minton of Napier and Hon. N. F. Murray of Oregon, with a view of employing Col. Waters for the entire series of meetings, Dr. Minton for North Missouri and Mr. Murray for South Missouri. Dr. Minton, by reason of business engagements, declined to serve and Dr. H. J. Waters, Dean of the Agricultural College, was named in his stead to talk on cattle feeding and discuss other live-stock questions in North Missouri.

The following is a list of the speakers and the subjects assigned each:

Col. G. W. Waters attended all the meetings and lectured on "Agricultural Education," "Soil Fertility" and "Pure Foods." After Dr. Waters left the force, he lectured on "Agricultural Education" and "Cattle Feeding."

Prof. J. C. Whitten, Professor of Horticulture, State University, was at the meetings in North Missouri and discussed "Commercial and Home Orchards," "Insect Pests and Plant Diseases."

Dr. H. J. Waters, Dean of the Agricultural College, attended the meetings from Laddonia to Richmond, inclusive, and talked on "Cattle Feeding" and "Clover and Cow Peas."

Dr. D. F. Luckey, State Veterinarian, attended all the meetings and selected as a special subject the "Horse's Foot." In addition he talked on the "Diseases of Live-Stock."

Hon. N. F. Murray, President State Horticultural Society, attended all the meetings in South Missouri and talked on "Commercial Orchards," "The Home Orchard" and "Floriculture." Also attended last week's meeting in North Missouri, taking the place of Dr. Schweitzer who was sick.

Prof. J. M. Stedman, Entomologist to the Experiment Station attended meetings in South Missouri and lectured on "Injurious Insects and the Manner of Controlling Them."

Dr. R. H. Jesse, President of the State University, Hon. W. T.

Carrington, State Superintendent of Public Schools, and Pres. John R. Kirk of the Kirksville Normal, each attended such meetings as their respective duties would permit and discussed such subjects as "Industrial Education," "Agriculture and the Common Schools," and "How to Improve our Rural Schools."

In addition to these, John Patterson, upon special request, was employed to attend meetings at Memphis, Bucklin, Mendon, Wheeling, Breckenridge, Cameron, Kearney and Richmond, and discussed the dairy interest.

G. A. Atwood attended several meetings in South Missouri and talked upon "Horticulture," the Board paying his expenses only.

President W. S. Dearmont of the Cape Girardeau Normal, and President A. A. Moore of the Chillicothe Schools, attended meetings in their respective localities and discussed educational topics.

By reason of the limited means available for institute purposes, every effort was made to reduce expenses. Col. Waters was the only lecturer who attended all the meetings in North Missouri on a salary from the institute fund and only Col. Waters and Mr. Murray were paid from this fund for services in South Missouri. The Agricultural College furnished two lecturers for North Missouri and one for South Missouri, to whom expenses only were paid. Had the funds justified the expenditure, it would probably have been better to have had another lecturer for the entire series.

In order to avoid the excitement and interest in the political campaign of 1900, the meetings were held at an earlier date than usual, but it is the opinion of those who have had long experience in farmers' institute work that this change in dates contributed largely to the success of the meetings.

This series of meetings, taken as a whole, is said to have been the best ever held in the State. In some few instances local differences, other attractions in the locality or a want of activity in working up an interest in the meeting by citizens of the vicinity, resulted in poorly attended meetings, but these were exceptions. Col. Waters reports splendid meetings and indications of unusual interest and high appreciation of the service at Lewistown, Memphis, Mendon, Wheeling, Richmond, Sheridan, Neosho, Pierce City, Perryville, Jackson, Willow Springs and Mountain Grove, and good meetings at all other points except Lawson,

Washington, Lebanon, Charleston and Neeleyville, where various local conditions were not favorable to success.

But regardless of the date upon which institutes are held, better meetings should be expected by reason of the increased interest among the farmers, the demand for scientific knowledge, for the results of experimental work and the practical experience of successful agriculturists.

The farmers' institute is probably the most efficacious means of giving this information to the public. In this way, at a nominal cost, thousands of farmers and farmers' sons receive annually the results of latest research and the practical conclusions derived from them, and are afforded an opportunity to ask questions and elicit explanatory answers that render the information available to all classes. From these, valuable suggestions are carried to neighboring farmers and from one locality to another, until the benefit derived from advanced thought is thoroughly disseminated.

The results from farmers' institute work in this State, may be seen in localities that have sought this means of information, in a largely increased use of clover, cow peas and other leguminous crops as fertilizers and stock food, in better care of the soil fertility, more thorough tillage, better methods in farming, the introduction of improved live-stock, more judicious breeding and the better care of growing stock.

Live-stock feeding is better understood, old methods have been discontinued and the farmer and feeder now feeds for a purpose, selecting an animal and using such foods as will give him the quickest results and most profitable returns.

Live-stock sanitation is better understood and disease breeding conditions avoided. Hog cholera, scabies in sheep, and other contagious and infectious diseases are not so prevalent and are more readily controlled. The importance of quarantine regulations against southern cattle fever is more fully appreciated, infected Missouri territory more carefully guarded and outbreaks of southern fever less numerous.

Creamery sharks and imported patent-right and fruit tree vendors have been practically driven from the State and their monstrous outrages, amounting in some instances to robbery, exposed.

Road improvement sentiment has been cultivated, resulting in a better use of available funds, and better roads, under existing unfavor-

able conditions. The demand for agricultural education in the common schools has been stimulated and a favorable answer will follow in the near future.

The farmers' institute is a school in agriculture for the farmer and the farmer's sons who for various reasons can not take advantage of the agricultural college course. At these meetings he is given an insight into the high character of his calling, he is encouraged to think, to investigate and to act for himself, to ascertain what others are doing and what he may do, to avoid the mistakes that have led to failure, and profit by experience that has resulted in success, to take advantage of opportunities offered by nature to improve his own condition and thereby contribute to the full development of his State. That this work should be continued and extended, that counties not accessible by rail to the regular institute force should be provided with institute work, is no longer questionable.

SPECIAL FARMERS' INSTITUTE MEETINGS.

In addition to the series of meetings above reported, the Executive Committee, in an effort to reach counties that for want of railroad facilities could not be accommodated by the regular institute force, arranged the following series of meetings which is now in progress:

Crane, Stone county, Monday, December 17, 1:30 and 7:30 p. m.

Galena, Stone county, Tuesday, December 18, 1:30 and 7:30 p. m.

Kirbyville, Taney county, Thursday, December 20, 1:30 and 7:30 p. m.

Forsyth, Taney county, Friday, December 21, 10:00 a. m. and 1:30 p. m.

Taneyville, Taney county, Friday, December 21, 7:30 p. m.

Brown Branch, Taney county, Saturday, December 22, 1:30 and 7:30 p. m.

Thornfield, Ozark county, Monday, December 24, 1:30 and 7:30 p. m.

Jones School House (near Lutie), Ozark county, Tuesday, December 25, 1:30 and 7:30 p. m.

Gainesville, Ozark county, Wednesday, December 26, 1:30 and 7:30 p. m.

Buckhart, Douglas county, Friday, December 28, 1:30 and 7:30 p. m.

Ava, Douglas county, Saturday, December 29, 1:30 and 7:30 p. m.

David, Texas county, Monday, December 31, 1:30 and 7:30 p. m.

Houston, Texas county, Tuesday, January 1, 1:30 and 7:30 p. m.

Licking, Texas county, Wednesday, January 2, 1:30 and 7:30 p. m.

Summersville, Texas county, Friday, January 4, 1:30 and 7:30 p. m.

Eminence, Shannon county, Saturday, January 5, 1:30 and 7:30 p. m.

Winona, Shannon county, Monday, January 7, 1:30 p. m.

Alton, Oregon county, Tuesday, January 8, 1:30 and 7:30 p. m.

Thayer, Oregon county, Wednesday, January 9, 1:30 and 7:30 p. m.

Col. G. W. Waters and Hon. A. S. Prather were employed as lecturers and will travel on horseback from one meeting to another. Several other such counties have not had the advantages of institute work, but with the small fund available could not be reached this season. Their applications are on file and a special effort should be made to supply them next season.

In view of supplying these counties with farmers' institute lecturers and extending the work in other localities not heretofore reached, it might be a matter of economy to employ an institute director, say six months each season. This director, after assisting in the regular series of meetings, could continue the work, and with the assistance of local talent, make answer to the many applications that the regular force is unable to answer each season. Heretofore you have been able with available funds to accommodate only about twenty to twenty-five per cent of the localities asking for institute work, but under the arrangement suggested, it is probable that every application might be answered without increasing the appropriation.

INDUSTRIAL MEETING.

The meeting of the State Industrial Associations under the auspices of your Board at Fayette, December 10 to 14, inclusive, was interesting, instructive and profitable. Transportation rates to those attend-

ing were more liberal and the attendance larger than heretofore. The discussions were able and evinced a thorough knowledge of the subjects under consideration. Differences of opinion of prominent and practical live-stock men and farmers, who are considered authorities, were brought out and discussed in detail. Present conditions were reviewed, and the obstacles to be overcome and advantages offered were fully considered by able and earnest thinkers. The results of long practical experience and the careful research of experiment stations were given to the public, that they may be tested on the farms and amongst the herds under conditions actually existing, and the results noted.

The importance of these meetings and the value of a thorough discussion of agricultural topics should not be underestimated. The results will be seen in the future in a better class of live stock, better kept and more fertile farms, more profitable returns for the farmer's labor, improved highways, greater interest in country schools, and a course of instruction that will meet the necessities of the farmers' sons and daughters, and a higher, more intelligent and progressive citizenship.

CATTLE QUARANTINE REGULATIONS.

At your last annual meeting it was ordered that cattle quarantine regulations then in force be continued. In accord with this action the Executive Committee, January 3, named the Secretary, Dr. H. J. Waters and Dr. Connaway a committee to formulate regulations governing the movement of Southern cattle. These regulations were approved and promulgated by the Governor January 13, 1900.

At the meeting of the Executive Committee March 8, the admission of Southern cattle into this State upon inspection was ordered prohibited between April 1 and November 1, and at the October meeting it was ordered that southern cattle be admitted upon inspection after November 15 to February 1, 1901; but no order was made asking the approval of the Governor to either of these changes or recommending that they be put in force through his proclamation as provided in section 10551, R. S. 1899. The fact that legal departments and live-stock agents of transportation companies and the live-stock sanitary boards of

other states regarded the Governor's proclamation as the only quarantine regulations in force and that the acts of March and October were in conflict with this and also with each other, and that live-stock inspectors of this State, under instructions, were openly ignoring the plain provisions of the Governor's proclamation, was to say the least confusing. No proclamation having been issued, the public was uninformed as to existing regulations, and from all these sources the demand for information and for authoritative action was so urgent that the committee at the November meeting rescinded the acts of March and October and declared the Governor's proclamation of January 13, 1900, in full force and effect. This proclamation embodies the provisions as to the admission of southern cattle upon inspection, that have been in force several years and under which many thousands of cattle had been annually "permitted" into the pastures and feed lots of Missouri, Kansas and other states with the most satisfactory results. With careful and efficient inspection no outbreak of southern fever had occurred. Missouri farmers were enabled to get cattle for the consumption of their products, upon inspection, at reasonable prices and at less freight rates and without the expense of yardage, feed bills and commissions that would have been charged at the stock yards. In formulating regulations for next season it is of importance to Missouri feeders and grazers, as well as the cattle owners in scheduled territory, that the freest possible movement be permitted to southern cattle consistent with the protection of the industry in this State, and from the results of the past, your judgment should direct you to safe and advantageous conclusions.

TUBERCULOSIS REGULATIONS.

At your last meeting the Executive Committee was authorized to formulate quarantine regulations against the admission of tuberculous cattle from states deemed dangerous to the cattle industry of Missouri. The Executive Committee, January 3, instructed a committee, composed of the Secretary, Drs. Waters and Connaway, to prepare a tuberculosis proclamation against the admission to this State of tuberculous breeding cattle. Regulations governing the movement of cattle from several states named were approved by the Governor and his proclamation issued putting them in force.

Against these regulations came numerous protests from the cattlemen of this and other states and from other live-stock sanitary boards. The legality of the regulations was seriously questioned by reason of the discrimination against breeding cattle, while dairy cattle, the most probable source of infection, were admitted without inspection. Again the regulations were ineffective, as the shipper of any class of cattle destined to Missouri had only to claim that they were dairy or other than breeding cattle, and they were received by the transportation companies and admitted to the State without hinderance.

Secretary C. P. Johnson of the Illinois Live Stock Sanitary Board, in a letter of July 21, says: "All breeding cattle destined for your state can be easily billed dairy cattle and escape your inspection. Hundreds of she cattle are taken from the (stock) yards to Missouri, without test, as dairy cattle." Dr. J. E. King, Inspector for Illinois, and stationed at the National Stock Yards says: "No cattle are tested here for Missouri. Your proclamation is entirely evaded and there are certainly cows affected with tuberculosis being imported into your State constantly. There are at least a hundred dairy cows taken from these yards to Missouri every week." Mr. Gentry, who upon the part of your Board attended a meeting of the Live-Stock Sanitary Boards convened in Kansas City on May the 23, says "this matter was fully discussed and we were asked to change our proclamation to include 'all bulls and she cattle.'" The Illinois Board pointed out the fact that "cheap she stuff was continually being purchased in the dairy districts for shipment west as stock cattle, thereby evading our quarantine law."

With this array of evidence as to the inefficiency of Missouri tuberculosis regulations, the Executive Committee at the September meeting ordered them suspended, and at the November meeting named a committee to draft a proclamation to that effect to be presented to the Governor for his approval and promulgation.

Should you deem it wise to take further action to prohibit the introduction of tuberculous cattle into this State, your experience in this matter and the decision of the Illinois Supreme Court, soon to be rendered on the regulations of that State, will no doubt enable you to reach judicious conclusions and to formulate safe and effective regulations.

During this year, three cattle inspectors have been stationed on the south line of Missouri, and each assigned territory as were those of last

season. G. G. Henry was located at Monett and charged with inspection for Jasper, Newton, McDonald and Barry counties. Ira Fenimore was assigned Stone, Taney, Ozark and Howell counties and Dr. Jesse Robards was stationed at Thayer and instructed to guard the quarantine line from that point to the Mississippi river and inspect cattle in Missouri along the Memphis railroad. Joseph Bruser was retained at Kansas City, Dr. John Forbs at St. Joseph and Geo. Boughner at St. Louis.

The appropriation for veterinary service made by the Fortieth General Assembly was $16,200, and there was a balance in the hands of your treasurer from the preceding appropriation of $1,998.24, making a total fund available for this biennial period of $18,198.24. Of this sum $7,421.10 was expended in 1899 and $9,551.28 to December 1, 1900, and the expenses for December, when paid at the meeting the first Wednesday in January and the expenses of quarantine meeting will practically consume the remainder of the fund, leaving but little if anything for expenses of the veterinary service for the months of January, February and March, 1901, or until the appropriations of the Forty-First General Assembly become available.

It will be observed that the expense of this service has increased $2,130.28 over that of 1899, an increase which will suggest to you either a larger appropriation for the next biennial period or more economy in expenditures.

ENFORCEMENT OF ANTI-BUTTERINE LAWS.

At the commencement of the season, D. A. Blanton was butterine inspector for St. Louis and Chas. E. Waters for Kansas City. At the meeting of the Executive Committee January 3, L. F. Luthy was appointed to assist Mr. Blanton in St. Louis and at the meeting March 8, Mr. Luthy was appointed inspector for the State, and Messrs. Blanton and Waters were discharged after the fifteenth of that month. R. L. Wright was employed to assist Mr. Luthy during the months of October and November in St. Louis. At a meeting of the committee in Kansas City, July 3, F. M. Slutz was employed to assist Mr. Luthy in that city.

At the October meeting Thos. Davies was employed as butterine inspector and permanently located at Kansas City.

The following cases were tried in the Court of Criminal Correction, St. Louis, Judge Clark presiding, with results given below.

1900.

January 3—No. 63—E. J. Hardesty, Union Market, agent Chicago factory, charged with selling colored oleo; Judge Clark's court, Harry Clover, attorney for the State, Blanton and Mrs. Wilkerson witnesses. Fined $50 and costs.

January 9—No. 64—Chas. Scheitlin, Wholesale Agent, No. 804 N. 3d St.; Judge Clark's court, fined $50 and costs; appealed to Federal court, Judge Adams, Harry Clover and Erd for the State; opinion lower court sustained. Fined $50 and costs.

January 31—No. 65—Thos. Keefe, No. 1817 Market St.; serving oleo; Judge Clark's court, Harry Clover for the State, Blanton witness, Dr. Potter Chemist. Fined $50 and costs.

January 31—No. 78—R. B. Stiles, Dairyman, No. 2525 Madison St., selling oleo mixed with butter; Judge Clark's court, Harry Clover for the State; Blanton and Lindsay witnesses, Dr. Potter chemist. Pleaded guilty, fine stayed. Fined $50 and costs.

March 7—No. 62—A. J. Bollwenk, No. 3101 S. Broadway, selling colored oleo; Judge Clark's court, Harry Clover and Chas. Erd for the State, Blanton and Mrs. Wilkerson witnesses, Dr. Potter, chemist; promised to quit the business. Pleaded guilty and paid costs.

March 7—W. C. Kessler; Judge Clark's court; Harry Clover for the State; Blanton witness. Acquitted.

March 7—J. C. Duemler; Judge Clark's court, Harry Clover for the State; on promise to quit. Pleaded guilty and paid costs.

March 7—H. G. Hoag; Judge Clark's court, Harry Clover for the State; on promise to quit. Pleaded guilty and paid costs.

March 7—J. Twist; Judge Clark's court, Harry Clover for the State. Fined $50 and costs.

December 14—Frank Hertel, illegal sale of imitation butter; Judge Clark's court, Harry Clover Attorney; L. F. Luthy and R. L. Wright witnesses. Fined $50 and costs.

December 14—Louis Meyer, illegal sale of imitation butter; Judge Clark's court, Harry Clover attorney; L. F. Luthy and R. L. Wright witnesses. Fined $50 and costs.

December 14—J. Mauer, illegal sale of imitation butter; Judge Clark's court, Harry Clover attorney; L. F. Luthy and R. L. Wright witnesses. Fined $50 and costs.

December 14—Adolph Pfanstcil, illegal sale of imitation butter; Judge Clark's court, Harry Clover attorney; L. F. Luthy and R. L. Wright witnesses. Discharged.

CONDITIONS IN KANSAS CITY.

In Kansas City results for the season have been fairly satisfactory. Prior to the discharge of Mr. Waters on March 15, he had secured convictions in four cases, had caused the return to Chicago of one shipment of lightly colored oleomargarine and the buttermen united in declaring the market practically free of colored goods and the conditions highly satisfactory. After the removal of a local inspector, complaints were numerous of the open violation of the anti-butterine act. This was continued until an inspector was placed in the city where he could persistently look after offenders and vigorously push the prosecution. With an efficient inspector there has been no trouble in obtaining satisfactory results in Kansas City for the last two years. The prosecuting attorney, James Reed, and his successor in office, Mr. Yates, assisted by Chas. Howell have faithfully and earnestly prosecuted every case filed with them and the results show that we have secured a verdict of guilty as charged and the imposement of a fine of $50 and costs in every case brought. The following is a report of the cases and the disposition of each.

1900.

January 29—No. 6—Clyde Skinner (agent for Latshaw), No. 1519 Main St.; unlawful delivery; Justice Peersley's court; Jas. Reed, prosecutor; Chas. E. Waters, witness. Fined $50 and costs.

January 29—No. 14—O. D. Clark, Manager Dold Butterine Department; Justice Spitz's court; Chas. Howell for the State; charged selling oleo over 'phone; Waters, witness. Fined $50 and costs.

January 7—No. 7—G. W. Hogue (agent Campbell Bros.), No. 610 Broadway; selling colored oleo; Justice Spitz's court; J. A. Reed for the State; Waters, witness. Fined $50 and costs.

February 5—No. 16—Mr. D. Brown (agent Campbell Bros.), unlawful delivery; Justice Spitz's court January 29, continued January 31; change venue to Justice Peersley's court; Chas. Howell for the State; Waters, witness, February 3. Fined $50 and costs.

February 5—Silverman Bros., Main St., selling lightly colored oleo; goods bought for uncolored, analysis showed color; goods returned to Chicago; no information filed.

September 5—E. L. Reisinger, Swift Packing Co., selling colored oleo; Justice Spitz's court; Chas. Howell for the State. Witnesses. Fined $50 and costs.

September 5—A. Denebeim, No. 521 Main St., selling colored oleo; Justice Spitz's court; Chas. Howell for the State. Witnesses. Fined $50 and costs.

September 5—A. Hammer, No. 2301 Prospect Ave., colored oleo; Justice Spitz's court; Chas. Howell for the State. Witnesses. Fined $50 and costs.

October 25—Douglas and Bolles, charged with selling colored oleo; F. M. Slutz, witness; Dr. Carter, chemist; Justice Peersley's court; Chas. Howell for the State. Guilty, fined $50 and costs.

October 25—Jones and Irwin, charged with selling colored oleo; Justice Peersley's court; Chas. Howell, attorney for the State; Dr. Carter, chemist; F. M. Slutz, witness. Guilty, fined $50 and costs.

November 22—W. E. McFarland, selling colored oleomargarine; F. M. Slutz, witness; Dr. Carter, chemist; Justice Peersley's court; Chas. Howell for State. Fined $50 and costs.

November 22—B. E. Phipps, selling colored oleomargarine; F. M. Slutz, witness; Dr. Carter, chemist; Justice Peersley's court; Chas. Howell attorney for State. Fined $50 and costs.

December 8—Two other cases are now pending in the Kansas City courts and seven more have been filed with the prosecutor.

Indicating the advantageous results of enforcement of anti-butterine legislation in this State, the average number of retail licenses issued by the government annually for the three years preceding the enactment of our present law was six hundred and seventy-four and for the three years

following was one hundred and ten, or in other words, under your enforcement of this law five hundred and sixty-four butterine dealers retired from business with a corresponding increase in the demand for and sale of pure butter.

In 1891, Missouri had seventeen wholesale dealers in oleomargarine, in 1892, thirteen; in 1893, fifteen; in 1894, twelve; in 1895, twelve, while in 1896, after the anti-butterine law went into effect, we had but two wholesale dealers; in 1897, none; in 1898, two; in 1899 but one, and this one, Chas. Scheitlin, was vigorously prosecuted by Inspector D. A. Blanton, fined $50 in Judge Clark's court, appealed to Federal court, alleging that the Missouri law was in violation of the United States interstate commerce act, Judge Adams presiding. The verdict of the lower court was sustained, but Scheitlin commenced business again, was re-arrested on order of Blanton and the case dismissed May 11, 1900.

Again for fiscal year ending June 30, 1899, by the latest available data, there was shipped into Illinois 18,500,000 pounds of oleomargarine; into Pennsylvania 11,500,000 pounds; Ohio 9,000,000 pounds; New Jersey 6,000,000 pounds, while Missouri received only 3,000,000 pounds, and it is probable that the larger per cent of this was uncolored and sold under the provisions of the anti-butterine law.

It should be remembered in connection with this statement, that while Illinois consumes six times the amount of oleomargarine that is consumed in Missouri, and while government licenses issued there, to both retailers and wholesalers average about ten times the number issued in your State, she has practically the same law governing the oleomargarine trade that is in effect here, the difference in favor of Missouri being an annual appropriation of $2,500 for enforcement, while Illinois must depend upon the ordinary avenues afforded by her statutes for the detection and punishment of crime, supplemented by contributions from dealers in pure butter.

SKIM MILK CHEESE LAW.

At the time of the passage of the act of 1897, regulating the sale of "skim milk" cheese, the enforcement of which was charged to this Board, there were in this State two retail dealers in "filled cheese" that had taken out government licenses. These licenses have never been

renewed and so far as "filled cheese" is concerned, the provisions of the law are no doubt strictly complied with. But while the Missouri law seeks to regulate under the name of "skim milk" cheese the manufacture, sale and transportation of all cheese not made from pure cream or unskimmed milk, the government regulations apply only to "filled" cheese, which is defined as those where animal fats or vegetable oils have been substituted for butter fats. Whether "skim milk" cheese, without these adulterations, is being sold in violation of the Missouri law, is not known. No appropriation was made for the enforcement of the law, but with butterine inspectors constantly in your employ, the additional cost of enforcing this law, or at least of making such an investigation as would determine if the law is being violated, would be but a trifling expense. Your attention is called to this matter that you may take such action as your judgment may direct.

THE LOUISIANA PURCHASE EXPOSITION.

The great exposition to be held in St. Louis in 1903, in memory of the Louisiana Purchase has passed beyond the stage of expectancy and is an assured event. With available funds for establishment and equipment amounting to fifteen millions of dollars, and under a management unsurpassed in energy and capability and with the enthusiastic support of the millions who have peopled this territory and the favorable sentiment of the remainder of mankind, this should be the most notable event in the history of the twentieth century, and in grandeur of design, in completeness of detail, in magnitude of exhibits, should surpass the combined excellencies of all other expositions opened to the world.

The voters of the State, appreciating their relation to this stupendous effort, and impressed with the importance of making a creditable display of the State's products, have authorized the Forty-first General Assembly to make an appropriation not to exceed one million dollars for a Missouri exhibit and that Missouri may make suitable preparations to be "at home" to the millions of visitors she will be called upon to entertain.

Your Board, charged with the supervision of all legalized departments and institutions of the State which are for the advancement of agriculture, will no doubt feel the deepest interest in an exhibit of the

State's agricultural products and her herds of live stock. While other exhibits may exploit the industries of our cities and the manufacturing advantages offered by the State, only an outpouring of her great herds will evidence their excellence and superiority, and a full and complete exhibit of her agricultural products speak for her unrivalled and unlimited resources. Every Missourian should contribute to the success of the exhibit, and I feel confident your Board will give all possible assistance in presenting to the world a record of the State's progress and a prophecy of her future grandeur.

STATE FAIR.

The State Fair Executive Committee had at its disposal, January 1, 1900, $8,226 in the Horse Breeders' Fund and $425 in the State Fair Fund, or a sum available for equipment of the State Fair grounds of $8,651. During the present season there has accumulated in the State Treasury under the provisions of the amended Breeders' bill $9,316, making a total fund for State Fair purposes of $17,967.

The committee, after a discussion of the propriety of such action at the last general Board meeting and with your consent, visited the State Fair grounds at Columbus, Ohio, Indianapolis, Indiana and Springfield, Illinois, with a view to examining the grounds and equipments, that it might note mistakes made, if any, in the establishment and management of these institutions, and profit by such action as had contributed to success.

Every step taken by your committee has been upon the most careful consideration and in the light of information obtained from successful managements in other states. A topographical survey of the grounds and preliminary surveys for the track were made that only the most economical action consistent with best results, might be taken.

Mr. N. H. Gentry was made superintendent of the grounds and of improvements to be made thereon, with authority to employ an architect and surveyor to assist in locating buildings, laying out grounds, and for such other work as he might deem necessary. He was also authorized to employ Geo. E. Kessler, landscape gardener for Kansas City, to do such work as Mr. Gentry might direct.

Of the fund on hand, four thousand dollars was appropriated for work on track and $9,790 has been expended in the erection of stables for speed horses, exhibition horses and cattle.

A fair must be held next season, or under the terms of the bill establishing the institution the "lands shall revert to the parties donating it," which reversion would carry with it all the improvements made thereon, the total value of the holdings amounting probably to fifty-five thousand dollars.

To make this exhibition creditable to the great State of Missouri, and such as shall evince the progressive spirit of her citizenship, will demand the best energy of those in charge. The completion of the track, the erection of an amphitheatre, an exhibition hall, additional stables for horses and cattle, sheep and swine pens, poultry and dairy buildings, are some of the necessities that must be provided for.

What means will be available for this purpose in addition to revenue accruing under Breeders' bill must be answered by the forty-first General Assembly. But in no event should buildings be erected or other improvements made, that will not compare favorably with similar equipments on grounds in the most progressive states. Missouri can not afford to do less for her farmers and live-stock breeders than others have done. The erection of temporary buildings with a view of replacing them with permanent structures in the future, is a waste of money that should not be tolerated by the State of Missouri, with more than a billion dollars' worth of taxable property and other sources that would prove an almost unbounded field for the collection of revenues.

Every step taken in connection with the State Fair, every dollar expended, should be with the clear understanding that what other states have done to encourage their agricultural and live stock interests, Missouri may do. Even this, probably, is not the high standard demanded by the excellence of our herds and the high character and notable achievements of our live-stock breeders. The Missouri Fair will be the exhibition home of Missouri herds that in points of excellence are the leading herds of the world, and should be provided with structures and conveniences in keeping with the superiority of our animals and such as will afford ample accommodation to breeders and contesting herds from other states.

With a sufficiency of State revenue, the Missouri General Assembly

may be depended upon for liberal assistance to this institution. In any event it will be provided with the absolute necessities of the present, and it will then remain with your Board to make the best possible use of available means and arrange for the first annual exhibition of the Missouri State Fair.

NOTE.—The Legislature appropriated $50,000 for the Fair. The date of the first meeting will be September 9 to 14, 1901.

CONCLUSION.

In conclusion permit me to say that long and continued connection with the Board of Agriculture as a member and later as an officer has developed a feeling of deepest interest in the future of the Board, a feeling of official kinship through which your success will bring the highest gratification and your failure bitter regret.

The magnitude and importance of the work assigned to you and the responsibilities with which you are charged demands untiring effort and unceasing watchfulness upon the part of the members, and the highest order of integrity, undoubted competency, fidelity and zeal in the discharge of duty, upon the part of employees. The high character of the members should not be brought into disrepute, nor their sincerity nor their earnestness questioned by the employment or retention of incompetent, careless or dishonest men. The character of the work done is the mouthpiece of the Board through which it speaks to the public. It is the avenue through which you make answer to the responsibilities with which, under the statutes, you are charged. If your employees are competent, prompt in the discharge of duty and the integrity of their acts is unquestioned, they reflect credit upon the Board, otherwise it is brought into disrepute and its work discredited.

But the difficulties with which you are confronted should not be underestimated. Without pay for your services, you are charged with more work than similar departments in other states. The enforcement of statutes placed under your direction has been opposed by influences supported by unlimited means and the work has been exasperating, and satisfactory results difficult to reach. To protect the live-stock of your state from the introduction of contagious and infectious diseases you are

forced to contend with adroit and unscrupulous smugglers, who in the past have had the mistaken sympathy and in some instances the co-operation of those whom your regulations were intended to protect. But the object and scope of your work is now more fully understood. With efficient service you will inspire confidence and command the appreciation and support of the public.

In severing official connection with the Board, as announced at your last annual meeting, I beg to acknowledge my enduring obligations for honors conferred and the uniform courtesy extended. To the work assigned me under the statutes I have given my best thought and most faithful service. If in any instance satisfactory results have been reached, much is due to your unflinching support and your well matured advice. My high appreciation of your uniform kindness can be evidenced only by loyalty to your official efforts and devotion to your personal aspirations. In gratitude for your favors and a high appreciation of the honors bestowed, I beg of you, both personally and in your official capacity, to command my best thought and most earnest efforts in your support.

REPORT OF AGRICULTURAL COLLEGE COMMITTEE.

We, the undersigned committee appointed to examine into the affairs of the Agricultural College and Experiment Station, after a careful examination, beg leave to submit the following report:

The improved live-stock herds, consisting of Shorthorns, Herefords, Polled Angus and Jerseys are of superior breeding and high individual merit, indicating judicious selection of foundation stock; and their excellent condition denotes a care in handling and developing that will doubtless lead to the best results, and that is creditable to the State. We examined the herds held for experiments in growing and maturing cattle for market. These herds are suitable for the respective purposes for which they were selected, the experiments are conducted with care and exactness and we are confident will prove of inestimable value to the great cattle industry of this State.

We would recommend that these experiments in feeding and maturing live-stock with the various feeds grown in this State, be continued and the results noted and given to the public, and as occasion may require the experiments be extended so as to cover the solution of all problems connected with live-stock husbandry as they may be presented.

We commend the investigations made by the Veterinary Department of the Experiment Station under Dr. J. W. Connaway in co-operation with this Board, of southern cattle fever, of its causes, the manner of transmission, the life history of the southern tick and especially the means of preventing southern fever by inoculation, and these experiments are of great value to the improved cattle breeders of this State, opening an avenue to the cattle markets of the Southwest for the products of their herds at largely advanced prices.

The Agricultural Farm has been improved, lands heretofore covered with brush and almost worthless have been converted into valuable pastures and are returning handsome profits and the general appearance of the farm is creditable. The farm is self-sustaining and the improvements noted are made from its revenues.

The Horticultural Experimental grounds are in excellent condition and we take pleasure in commending the work being done and the experiments made by Dr. J. C. Whitten and would advise the printing and distribution of bulletins in largely increased numbers giving the results to the public.

The entomological work, looking to the control of injurious insects in our fields and orchards, the most successful and economical means of extirpation and to such action as will prevent their introduction into the State, is of material importance and under the charge of Dr. Stedman, the entomologist of the Experiment Station, promises good results.

The high character of the work being done at the Missouri Experiment Station speaks in the most commendable manner of the earnestness and capability of those in charge. Every possible effort should be made by the University and by the State to maintain the present high standard of excellence. The station should be equipped so as to insure the best results and every facility offered for achieving leadership in a work of such incalculable value to the agricultural and live-stock interests of the State.

It is with pleasure that we note a healthy increase in the number of students attending the Agricultural College, the good repute of the work among the farmers of the State, and feel certain that the high character and the thorough equipment of the professors of the Agricultural Department is worthy of the fullest confidence of the public.

The winter short course in agriculture and the summer course for

teachers are commended to the public. In the winter course, lessons in live-stock husbandry, dairying and horticulture are available without cost to farmers and farmers' sons who can not take the regular agricultural course. The summer course offers facilities for the equipment of teachers in elementary agriculture and for special lines that they probably can not obtain elsewhere at a time not otherwise engaged, and we would urge that the fullest information as to these courses be given to the public.

We especially commend the action of the Legislature and the authorities of the College in establishing and fully equipping a Department of Household Economics, and are gratified to find that this department is meeting with the sympathy of the University interests and the support of the public. We believe that the department is splendidly officered and well calculated to exert a profound influence in the building up of Missouri homes.

J. A. POTTS,
EUGENE RHOADES,
C. P. COOK,
} Committee.

On motion the report was received and the committee discharged.

Distribution of the Funds of The College of Agriculture and Mechanic Arts for the Biennial Period Beginning January 1, 1901.

INCOME FOR TWO YEARS.

Morrill Fund, after deducting one-fourth to Rolla	$35,156
Land Grant Fund, after deducting one-fourth to Rolla	26,241
Incidental Fees	1,650
Total for two years	$63,047

EXPENSES.

A. Salaries of Technical Men.

Dean, (one-half salary)	$ 2,500
Professor of Agriculuture	4,250
Professor of Horticulture (one-half salary)	2,000
Professor of Entomology (one-half salary)	2,200

Professor of Agricultural Chemistry (one-half salary)	2,200
Professor of Veterinary Science (one-half salary)	2,200
Drawing, $2,700, less charge for Normal Drawing of $500, for biennial period	2,200
Mechanical Engineering (total)	4,000
Civil Engineering (total)	4,000
Electrical Engineering (total)	4,000
Assistants in Shops (total)	1,860
Commercial (total)	1,600
Stenographer (one-half salary)	600
Household Economics (total)	2,600
Goodman, Murray and Dairyman for short courses (total)	1,000
	$37,360

B. Salaries of Non-technical Men.

English (partial salary)	$ 2,500
Mathematics (partial salary)	2,500
Geology and Mineralogy (partial salary)	250
Physics (partial salary)	2,000
Botany (partial salary)	1,000
General Chemistry (partial salary)	2,000
Political Economy (partial salary)	250
Bacteriology (partial salary)	250
	$10,750

C. Current Expenses (One-fifth).

Proportion of the Current Expenses (one-fifth)	$14,000
Total for two years (a, b, c)	61,960
Balance for permanent equipment of College	2,087
Balance of permanent equipment fund due and unexpended in the present Biennial Period and to be added to the above.	54,445

N. B.—This calculation takes no note of any unexpected balance that may be in the appropriation of Mr. Mumford or of a balance unexpended for cattle by Mr. Waters out of an appropriation made out of this equipment fund.

If any salaries mentioned in this list are changed by order of the Board before January, 1901, due corrections shall be made in this apportionment; but if the changes are made by action of the Board after January 1, 1901, they shall not affect the final balance.

We regard this as a fair and equitable distribution of the funds mentioned above.

(Signed.)

R. H. JESSE,
H. J. WATERS.

REPORT OF AUDITING COMMITTEE.

We, the undersigned committee authorized to examine vouchers in the hands of the Secretary and warrants paid and returned by the Treasurer and compare these with the financial statement, after a careful examination submit the following report: The books in the Secretary's and Treasurer's office were found to correspond and vouchers approved by the Executive Committee were exhibited covering all expenditures reported in the financial statement. We find the following balances in the hands of our Treasurer to the credit of the several funds:

Expense of Members	$ 415 32
Office Expense	71 22
Butterine Fund	1,073 68
Farmers' Institute Fund	855 22
State Veterinary Fund	1,163 76
Monthly Crop Report	169 73
State Fair Fund	14,342 35

The money appropriated has been expended so as to meet all requirements. No deficit is charged to any of the funds. All of which is respectfully submitted.

J. A. POTTS,
C. P. COOK,
EUGENE RHOADES,

On motion the report was approved and ordered placed on file.

ELECTION OF OFFICERS.

On motion nominations were dispensed with, the names of the several candidates reported and the ballot spread with the following results:

President—W. R. Wilkinson.
Vice-President—C. P. Cook.
Secretary—Geo. B. Ellis.
Assistant Secretary—Snowdon Willis.
Treasurer—H. H. Banks.

EXECUTIVE COMMITTEE.

W. R. Wilkinson.
C. P. Cook.
H. J. Waters.
D. A. Ely.
F. J. Hess.

On motion a recess was taken, after which the Board met in the capacity of State Fair Directory.

STATE FAIR DIRECTORY.

President Norman J. Colman called the meeting to order. All members present except Gov. Lon. V. Stephens and Hon. J. F. Groves.

On motion, reading minutes of annual meeting of Fair Directory dispensed with and the minutes as printed in annual report approved.

Hon. Norman J. Colman was placed in nomination for President and on motion the Secretary was directed to cast unanimous vote for him and declare his election.

N. H. Gentry was elected Vice-President by acclamation.

On motion of Alex. Maitland, the President cast the unanimous vote of the directors for J. R. Rippey as Secretary of the State Fair and declared him elected.

On motion of Mr. Gentry, Secretary was instructed to cast unanimous vote for C. W. McAninch for Treasurer and he was declared elected to that position.

On motion Messrs. Carrington, Colman, Gentry, Potts, Maitland and North were declared State Fair Executive Committee.

On motion of Mr. Ellis the State Fair Executive Committee was instructed to fix salary of Secretary.

State Fair Directory adjourned.

STATE BOARD OF AGRICULTURE.

State Board of Agriculture called to order by President Wilkinson.

Committee on Resolutions submits the following report which was unanimously adopted.

REPORT OF THE COMMITTEE ON RESOLUTIONS.

WHEREAS, It has pleased Col. J. R. Rippey to voluntarily retire from the Secretaryship of this Board, and

WHEREAS, During his connection with the Board as a member for five years and as its Secretary for eight years he has been recognized as a leader in every movement looking to the advancement of all the agricultural interests of the State and

WHEREAS, During his administration as Secretary he has brought the Board into the closest touch with the farming classes of every section of the State, has been instrumental in securing invaluable legislation for the promotion and protection of our agricultural interests, has brought the varied and unlimited resources of Missouri to the favorable attention of the world through his official publications, has secured increased appropriations for the enlargement of the scope and usefulness of the Board and has brought this State Department to that high position that the importance of the interests it represents entitles it to occupy, therefore be it

Resolved, That this Board record its high appreciation of these splendid achievements, of his untiring energy, his unselfish devotion to

duty, his unimpeachable integrity, and express its sincere regret that this Board will be deprived of his valuable assistance, his faithful service and his wise counsel.

F. J. Hess,
D. A. Ely,
H. J. Waters. } Committee.

December 19th, 9 a. m.

Board of Agriculture called to order by President Wilkinson, Dr. Luckey presents the following resolution, which on motion of Mr. Carrington was adopted:

Whereas, The State Board of Agriculture realizes the fact that the farmers of this State are greatly imposed upon by incompetent persons who profess to be veterinarians, and

Whereas, Instead of benefiting the owner of the stock by such treatment as they administer, said incompetent persons not only damage the interest of the farmer but cause the stock that they treat to suffer cruel and unnecessary barbarities, and

Whereas, We appreciate the usefulness of the qualified veterinary surgeon to the live stock producers of this State and feel that thoroughness should be encouraged in this profession; therefore, be it

Resolved, That it is the sense of this Board that for the protection of the farmers against the imposition of incompetent veterinarians the Forty-first General Assembly be and is hereby urged to make a law regulating the practice of veterinary surgery and requiring a reasonable standard of qualification on the part of those who practice the profession.

On motion of Mr. Ely the Executive Committee in defining cattle quarantine line was instructed to follow government quarantine line provided that line follows the Missouri State line so as to exclude all Missouri from scheduled territory, and the details of other regulations were left to the Executive Committee.

On motion of Mr. North the present live stock inspectors were retained until March 1, if funds are available to pay for services.

On motion of Mr. Hess southern cattle will be admitted upon inspection from November 1 until April 1, of each season. Adjourned.

SECRETARY'S FINANCIAL STATEMENT.

Distribution of Annual Report Fund.

Date.	Warrant Number.	Name.	Dr.	Cr.
1900.				
May 4		To requisition	$150 00	
June 4	105	By E. F. Ammerman		$150 00
			$150 00	$150 00

Monthly Crop Report Fund.

Date.	Warrant Number.	Name.	Dr.	Cr.
1900.				
Jan. 1		To balance	$165 78	
Jan. 3	190	By S. H. Elkins		$15 90
Feb. 7		To requisition	100 00	
Feb. 7	191	By S. H. Elkins		15 00
Mar. 8	192	By Burckhartt & Rice		7 25
Mar. 8	193	By S. H. Elkins		68 60
April 4		To requisition	100 00	
April 4	194	By S. H. Elkins		20 50
April 4	195	By Burckhartt & Rice		6 00
May 4		To requisition	300 00	
May 4	196	By S. H. Elkins		11 00
May 4	197	By Burckhartt & Rice		28 10
May 4	198	By E. W. Stephens		243 50
June 4		To requisition	100 00	
June 4	199	By American Express Co		58 19
June 4	200	By Burckhartt & Rice		8 50
June 4	201	By S. H. Elkins		44 50
July 3		To requisition	150 00	
July 3	202	By American Express Co		2 46
July 3	203	By S. H. Elkins		41 00
July 3	204	By E. F. Ammerman		4 60
July 3	205	By Missouri Agricultural Experiment Station		15 75
July 3	206	By E. W. Stephens		70 40
July 3	207	By Burckhartt & Rice		7 50
July 3	208	By W. E. Harshe		3 00
Aug. 1	209	By Burckhartt & Rice		2 50
Aug. 1	210	By W. E. Harshe		3 10
Aug. 1	211	By E. W. Stephens		66 00
Sept. 5		To requisition	100 00	
Sept. 5	212	By Burckhartt & Rice		54 50
Sept. 5	213	By W. E. Harshe		12 45
Oct. 3	214	By S. H. Elkins		15 00
Oct. 3	215	W. E. Harshe		2 95
Oct. 3	216	E. W. Stephens		70 30
Dec. 13		To requisition	50 00	
Dec. 13	217	By Missouri Statesman		2 50
Dec. 31		By balance		169 73
			$1,065 78	$1,065 78

Expense of Members' Fund.

Date.	Warrant Number.	Name.	Dr.	Cr.
1900.				
Jan. 1		To balance	$269 57	
Jan. 3	370	By T. B. North		$15 20
Jan. 3	371	By L. F. Luthy		21 85
Jan. 3	372	By John W. Hill		13 50
Jan. 3	373	By W. R. Wilkinson		13 65
Feb. 7	374	By T. B. North		1 85
Feb. 7	375	By J. R. Rippey		4 20
Feb. 7	376	By John W. Hill		17 30
Mar. 8	377	By John W. Hill		13 50
Mar. 8	378	By W. R. Wilkinson		12 70
Mar. 8	379	By L. F. Luthy		12 70
April 4	380	By J. R. Rippey		5 80
April 4	381	By T. B. North		3 10
May 4	382	By H. J. Waters		8 85
May 4	383	By T. B. North		3 85
May 4	384	By J. W. Hill		17 75
May 4	395	By J. R. Rippey		5 70
May 4	386	By W. R. Wilkinson		5 60
June 4		To requisition	100 00	
June 4	387	By T. B. North		6 00
June 4	388	By W. R. Wilkinson		21 00
June 4	389	By J. W. Hill		7 00
June 4	390	By J. R. Rippey		7 80
June 4	391	By L. F. Luthy		12 45
July 3	392	By J. R. Rippey		13 21
July 3	393	By W. R. Wilkinson		11 85
July 3	394	By J. W. Hill		8 85
Aug. 1	395	By T. B. North		4 00
Aug. 1	396	By J. R. Rippey		7 12
Aug. 1	397	By J. W. Hill		17 50
Sept. 5	398	By J. W. Hill		20 00
Sept. 5	399	By T. B. North		2 70
Sept. 5	400	By J. R. Rippey		8 60
Sept. 5	401	By Geo. B. Ellis		4 10
Oct. 3		To requisition	100 00	
Oct. 3	402	By J. R. Rippey		8 60
Oct. 3	403	By T. B. North		6 00
Oct. 3	404	By J. W. Hill		16 92
Oct. 3	405	By H. J. Waters		8 85
Oct. 3	406	By W. R. Wilkinson		2 05
Oct. 3	407	By Alex. Maitland		4 00
Nov. 8	408	By J. W. Hill		19 20
Nov. 8	409	By L. F. Luthy		10 85
Dec. 13		To requisition	350 00	
Dec. 13		By balance		415 32
			$819 57	$819 57

Office Expense Fund.

Date.	Warrant Number.	Name.	Dr.	Cr.
1900.				
Jan. 1		To balance	$82 39	
Jan. 3	319	By Lelia B. Willis		$10 00
Jan. 3	320	By W. E. Harshe		4 85
Jan. 3	321	By Sam Berry		15 10
Feb. 7		To requisition	100 00	
Feb. 7	322	By Lelia B. Willis		10 00
Feb. 7	323	By Sam Berry		17 05
Feb. 7	324	By Wyckoff, Seamens & Benedict		3 25
Feb. 7	325	By W. E. Harshe		4 50
Feb. 7	326	By E. W. Stephens		5 00
Feb. 7	327	By Columbia Telephone Co		6 00
Mar. 8		To requisition	50 00	
Mar. 8	328	By Sam Berry		15 95
Mar. 8	329	By Lelia B. Willis		10 00
Mar. 8	330	By Wyckoff, Seamens & Benedict		8 00
Mar. 8	331	By S. H. Elkins		15 00
Mar. 8	332	By W. E. Harshe		1 15
Mar. 8	333	By E. F. Ammerman		5 17
Mar. 8	334	By S. H. Elkins		36 40
April 4		To requisition	100 00	
April 4	335	By Lelia B. Willis		10 00
April 4	336	By Gant Bros.		12 28
April 4	337	By Sam Berry		17 13
April 4	338	By E. F. Ammerman		27 20
May 4		To requisition	50 00	
May 4	339	By Lelia B. Willis		10 00
May 4	340	By Sam Berry		16 70
May 4	341	By W. E. Harshe		3 00
May 4	342	By Columbia Telephone Co		6 00
June 4		To requisition	50 00	
June 4	343	By Sam Berry		19 05
June 4	344	By Cadogan-Hatcher Co		6 50
June 4	345	By S. H. Elkins		32 00
June 4	346	By Lelia B. Willis		10 00
June 4	347	By G. W. Burroughs		50
June 4	348	By W. E. Harshe		85
July 3	349	By Lelia B. Willis		10 00
July 3	350	By Garfield Berry		16 03
Aug. 1	351	By W. E. Harshe		1 00
Aug. 1	352	By Lelia B. Willis		10 00
Aug. 1	353	By Sam Berry		15 25
Sept. 5		To requisition	50 00	
Sept. 5	354	By Lelia B. Willis		10 00
Sept. 5	355	By Columbia Telephone Co		6 35
Sept. 5	356	By Sam Berry		16 83
Oct. 3		To requisition	100 00	
Oct. 3	357	By Lelia B. Willis		10 00
Oct. 3	358	By Sam Berry		16 20
Nov. 8	359	By Lelia B. Willis		10 00
Nov. 8	360	By Sam Berry		16 98
Dec. 13	361	By Lelia B. Willis		10 00
Dec. 13	362	By Sam Berry		15 55
Dec. 13	363	By W. E. Harshe		2 55
Dec. 13	364	By E. F. Ammerman		5 80
Dec. 31		By balance		71 22
			$582 39	$582 39

State Veterinary Service Fund.

Date.	Warrant Number.	Name.	Dr.	Cr.
1899.				
Dec. 19		To balance	$677 14	
Dec. 20	977	By D. A. Ely		$32 50
Dec. 20	978	By J. F. Groves		3 80
Dec. 20	979	By J. A. Potts		4 00
Dec. 20	980	By Alex. Maitland		15 00
Dec. 20	981	By N. J. Colman		11 50
Dec. 20	982	By Eugene Rhoades		6 50
Dec. 20	983	By W. R. Wilkinson		20 50
Dec. 20	984	By Thos. B. North		15 20
Dec. 20	985	By F. J. Hess		27 30
Dec. 20	986	By L. F. Luthy		16 15
Dec. 20	987	By Geo. B. Ellis		5 80
Dec. 20	988	By W. T. Carrington		4 50
Dec. 20	989	By N. H. Gentry		7 60
Dec. 20	990	By J. W. Hill		12 50
Dec. 20	991	By C. M. O'Connell		10 60
1900.				
Jan. 3		To requisition	900 00	
Jan. 3	992	By P. Mahnkey		35 00
Jan. 3	993	By J. Bruser		25 00
Jan. 3	994	By G. H. Boughner		25 00
Jan. 3	995	By John Forbes		25 00
Jan. 3	996	By Stanley Smith		37 40
Jan. 3	997	By J. R. Rippey		7 50
Jan. 3	998	By D. F. Luckey		107 10
Jan. 3	999	By H. J. Waters		3 95
Jan. 3	1000	By M. L. Blackwell		50 00
Jan. 3	1001	By D. N. Jewett		101 45
Jan. 3	1002	By Jesse Robards		28 15
Jan. 3	1003	By H. H. Banks		32 15
Jan. 3	1004	By E. F. Ammerman		2 77
Jan. 3	1005	By T. E. White		178 60
Feb. 7		To requisition	1,000 00	
Feb. 7		To Warrant No. 234—Butterine Fund	38 00	
Feb. 7	1006	By T. E. White		120 64
Feb. 7	1007	By E. W. Stephens		347 00
Feb. 7	1008	By M. L. Blackwell		50 00
Feb. 7	1009	By Ira Fenimore		58 95
Feb. 7	1010	By D. N. Jewett		105 91
Feb. 7	1011	By John Forbes		25 00
Feb. 7	1012	By Joseph Bruser		25 00
Feb. 7	1013	By Geo. H. Boughner		25 00
Feb. 7	1014	By Jesse Robards		125 40
Feb. 7	1015	By P. Mahnkey		11 66
Feb. 7	1016	By D. F. Luckey		75 00
Feb. 7	1017	By E. F. Ammerman		6 63
Mar. 8		To requisition	800 00	
Mar. 8	1018	By Joseph Bruser		25 00
Mar. 8	1019	By Geo. H. Boughner		25 00
Mar. 8	1020	By John Forbes		25 00
Mar. 8	1021	By Jesse Robards		149 85
Mar. 8	1022	By D. N. Jewett		118 16
Mar. 8	1023	By Ira Fenimore		103 85
Mar. 8	1024	By M. L. Blackwell		50 00
Mar. 8	1025	By D. F. Luckey		274 00
April 4		To requisition	500 00	
April 4	1026	By Geo. H. Boughner		25 00
April 4	1027	By Joseph Bruser		25 00
April 4	1028	By John Forbes		25 00
April 4	1029	By Ira Fenimore		103 00
April 4	1030	By D. F. Luckey		183 54
April 4	1031	By M. L. Blackwell		50 00
April 4	1032	By G. G. Henry		130 00
April 4	1033	By Jesse Robards		100 00
May 4		To requisition	700 00	
May 4	1034	By M. L. Blackwell		50 00
May 4	1035	By D. F. Luckey		229 41
May 4	1036	By Geo. H. Boughner		25 00
May 4	1037	By Joseph Bruser		25 00
May 4	1038	By John Forbes		25 00
May 4	1039	By G. G. Henry		126 30

State Veterinary Service Fund.—Continued.

Date.	Warrant Number.	Name.	Dr.	Cr.
May 4	1040	By Jesse Robards		$143 63
May 4	1041	By Ira Fenimore		102 70
June 4		To requisition	$1,000 00	
June 4	1042	By John Forbes		25 00
June 4	1043	By Geo. H. Boughner		25 00
June 4	1044	By Joseph Bruser		25 00
June 4	1045	By M. L. Blackwell		50 00
June 4	1046	By E. F. Ammerman		122 60
June 4	1047	By N. H. Gentry		3 50
June 4	1048	By G. G. Henry		115 55
June 4	1049	By Ira Fenimore		75 00
June 4	1050	By Jesse Robards		121 80
June 4	1051	By D. F. Luckey		252 94
July 3		To requisition	700 00	
July 3	1052	By Geo. H. Boughner		25 00
July 3	1053	By Joseph Bruser		25 00
July 3	1054	By John Forbes		25 00
July 3	1055	By M. L. Blackwell		50 00
July 3	1056	By D. F. Luckey		209 46
July 3	1057	By H. H. Banks		32 94
July 3	1058	By Ira Fenimore		111 90
July 3	1059	By Jesse Robards		121 71
July 3	1060	By G. G. Henry		109 80
July 3	1061	By R. B. Love		31 20
Aug. 1		To requisition	700 00	
Aug. 1	1062	By Geo. H. Boughner		25 00
Aug. 1	1063	By John Forbes		25 00
Aug. 1	1064	By Joseph Bruser		25 00
Aug. 1	1065	By M. L. Blackwell		50 00
Aug. 1	1066	By E. M. Hendy		9 00
Aug. 1	1067	By Dr. E. Brainerd		5 00
Aug. 1	1068	By H. J. Waters		75 00
Aug. 1	1069	By Jesse Robards		118 60
Aug. 1	1070	By Ira Fenimore		95 86
Aug. 1	1071	By D. F. Luckey		210 80
Aug. 1	1072	By G. G. Henry		108 40
Sept. 5		To requisition	800 00	
Sept. 5	1073	By M. L. Blackwell		50 00
Sept. 5	1074	By John Forbes		25 00
Sept. 5	1075	By Joseph Bruser		25 00
Sept. 5	1076	By Geo. H. Boughner		25 00
Sept. 5	1077	By E. Brainerd		6 90
Sept. 5	1078	By E. M. Hendy		49 60
Sept. 5	1079	By D. F. Luckey		214 70
Sept. 5	1080	By Ira Fenimore		92 00
Sept. 5	1081	By Jesse Robards		128 96
Sept. 5	1082	By E. F. Ammerman		4 51
Sept. 5	1083	By G. G. Henry		100 00
Oct. 3		To requisition	1,000 00	
Oct. 3	1084	By M. L. Blackwell		50 00
Oct. 3	1085	By D. F. Luckey		150 00
Oct. 3	1086	By John Forbes		25 00
Oct. 3	1087	By Geo. H. Boughner		25 00
Oct. 3	1088	By Joseph Bruser		25 00
Oct. 3	1089	By S. H. Elkins		26 00
Oct. 3	1090	By Wyckoff, Seamens & Benedict		3 50
Oct. 3	1091	By E. M. Hendy		188 20
Oct. 3	1092	By E. M. Hendy		81 55
Oct. 3	1093	By E. F. Ammerman		5 59
Oct. 3	1094	By Burckhartt & Rice		4 90
Oct. 3	1095	By Jesse Robards		129 79
Oct. 3	1096	By Ira Fenimore		96 81
Oct. 3	1097	By G. G. Henry		116 40
Nov. 8		To requisition	1,100 00	
Nov. 8	1098	By M. L. Blackwell		50 00
Nov. 8	1099	By Geo. H. Boughner		25 00
Nov. 8	1100	By Joseph Bruser		25 00
Nov. 8	1101	By John Forbes		25 00
Nov. 8	1102	By Jesse Robards		135 30
Nov. 8	1103	By Ira Fenimore		121 90
Nov. 8	1104	By G. G. Henry		117 50
Nov. 8	1105	By E. F. Ammerman		5 31
Nov. 8	1106	By D. F. Luckey		365 04
Nov. 8	1107	By E. M. Hendy		213 65
Nov. 8	1108	By E. M. Hendy		33 65

State Veterinary Service Fund.—Continued.

Date.	Warrant Number.	Name.	Dr.	Cr.
Nov. 8	1109	By Columbia Telephone Co.		6 00
Dec. 13		To requisition	900 00	
Dec. 13	1110	By M. L. Blackwell		50 00
Dec. 13	1111	By Joseph Bruser		25 00
Dec. 13	1112	By Geo. H. Boughner		25 00
Dec. 13	1113	By John Forbes		25 00
Dec. 13	1114	By Jesse Robards		123 71
Dec. 13	1115	By G. G. Henry		120 30
Dec. 13	1116	By Ira Fenimore		89 43
Dec. 13	1117	By Missouri Statesman		16 75
Dec. 13	1118	By E. M. Hendy		29 65
Dec. 13	1119	By D. F. Luckey		150 00
Dec. 13	1120	By E. F. Ammerman		2 29
Dec. 13	1121	By J. W. Connaway		47 28
Dec. 31		By balance		1,163 76
			$10,815 14	$10,815 14

Butterine Fund.

Date.	Warrant Number.	Name.	Dr.	Cr.
1900.				
Jan. 1		To balance	$176 61	
Jan. 3		To requisition	400 00	
Jan. 3	227	By John R. Rippey		$50 00
Jan. 3	228	By Chas. E. Waters		58 20
Jan. 3	229	By Mrs. Myra Wilkerson		23 00
Jan. 3	230	By D. A. Blanton		82 10
Jan. 3	231	By Taylor & Erd		100 00
Jan. 3	232	By St. Louis Sampling and Testing Works		40 00
Jan. 3	233	By H. H. Banks		9 92
Feb. 7		To requisition	400 00	
Feb. 7	234	By Veterinary Fund		38 00
Feb. 7	235	By J. R. Rippey		50 00
Feb. 7	236	By Chas. E. Waters		66 20
Feb. 7	237	By J. W. Carter		15 00
Feb. 7	238	By L. F. Luthy		49 83
Feb. 7	239	By D. A. Blanton		65 00
Feb. 7	240	By Sterling Bros.		4 75
Feb. 7	241	By Amelia Voth		22 00
Feb. 7	242	By St. Louis Sampling and Testing Works		85 00
Feb. 7	243	By M. B. Wilkerson		39 76
Feb. 7	244	By L. F. Luthy		12 94
Feb. 7	245	By D. A. Blanton		16 81
Mar. 8		To requisition	400 00	
Mar. 8	246	By J. R. Rippey		50 00
Mar. 8	247	By D. A. Blanton		65 00
Mar. 8	248	By Chas. E. Waters		58 55
Mar. 8	249	By L. F. Luthy		116 25
April 4		To requisition	300 00	
April 4	250	By J. R. Rippey		50 00
April 4	251	By Chas. E. Waters		26 00
April 4	252	By L. F. Luthy		85 00
April 4	253	By D. A. Blanton		32 50
April 4	254	By D. A. Blanton		2 93
April 4	255	By St. Louis Sampling and Testing Works		15 00
April 4	256	By Taylor & Erd		130 00
April 4	257	By L. F. Luthy		61 21
May 4		To requisition	400 00	
May 4	258	By J. R. Rippey		50 00
May 4	259	By L. F. Luthy		98 30
May 4	260	By Myra B. Wilkerson		3 95
June 4	261	By J. R. Rippey		50 00

Butterine Fund.—Continued.

Date.	Warrant Number.	Name.	Dr.	Cr.
June 4	262	By L. F. Luthy		86 95
June 4	263	By Mrs. Adele Heinburger		8 70
June 4	264	By Miss E. R. Anshutz		5 00
June 4	265	By G. O. Simmons		9 00
July 3	266	By J. R. Rippey		50 00
July 3	267	By H. H. Banks		9 92
July 3	268	By Miss E. R. Anshutz		7 50
July 3	269	By Mrs. Adele Heinburger		8 95
July 3	270	By L. F. Luthy		94 20
Aug. 1		To requisition	250 00	
Aug. 1	271	By J. R. Rippey		50 00
Aug. 1	272	By L. F. Luthy		85 00
Sept. 5		To requisition	200 00	
Sept. 5	273	By L. F. Luthy		109 10
Sept. 5	274	By J. W. Carter		20 00
Sept. 5	275	By J. R. Rippey		50 00
Oct. 3		To requisition	300 00	
Oct. 3	276	By J. R. Rippey		50 00
Oct. 3	277	By Carl G. Hinrichs		70 00
Oct. 3	278	By L. F. Luthy		120 66
Oct. 3	279	By J. W. Carter		20 00
Nov. 8		To requisition	300 00	
Nov. 8	280	By J. R. Rippey		50 00
Nov. 8	281	By L. F. Luthy		66 65
Nov. 8	282	By R. L. Wright		31 40
Nov. 8	283	By J. W. Carter		30 00
Nov. 8	284	By Thos. Davies		45 25
Dec. 13		To requisition	1,000 00	
Dec. 13	285	By J. R. Rippey		50 00
Dec. 13	286	By J. W. Carter		30 00
Dec. 13	287	By R. L. Wright		42 50
Dec. 13	288	By L. F. Luthy		68 75
Dec. 13	289	By Thos. Davies		60 70
Dec. 31		By balance		1,073 68
			$4,126 61	$4,126 61

Farmers' Institute Fund.

Date.	Warrant Number.	Name.	Dr.	Cr.
1900.				
Jan. 1		To balance	$15 07	
Jan. 3	436	By H. H. Banks		$7 93
July 3	437	By H. H. Banks		7 14
Aug. 1		To requisition	1,900 00	
Aug. 1	438	By J. R. Rippey		1,900 00
Dec. 19		To deposit by Secretary Rippey	855 22	
Dec. 19		By balance in hand of our treasurer		855 22
			$2,770 29	$2,770 29

Secretary's Account.

Date.	Name.	Dr.	Cr.
1899.			
Dec. 31	To balance	$467 94	
1900.			
Jan. 1	By N. J. Colman		$5 00
Jan. 3	By Milton Dearing		2 20
Feb. 7	By E. F. Ammerman		41 47
June 4	By S. H. Elkins		52 00
Aug. 1	By S. H. Elkins		26 90
Aug. 1	By Burckhartt & Rice		6 00
Aug. 1	To warrant on Farmers' Institute Fund, No. 438	$1,900 00	
Aug. 11	By S. H. Elkins, postage		5 00
Aug. 17	By S. H. Elkins, postage		11 00
Aug. 20	By S. H. Elkins, postage		15 00
Aug. 21	By G. W. Waters		200 00
Aug. 27	By S. H. Elkins, postage		5 00
Sept. 1	By John Patterson		20 00
Sept. 19	By John Patterson		48 94
Sept. 19	By J. C. Whitten		72 77
Sept. 11	By Alex, Maitland		1 80
Sept. 14	By N. F. Murray		100 00
Sept. 24	By R. J. Clark, Jr		1 60
Sept. 28	By H. J. Waters		49 21
Sept. 28	By J. R. Rippey		34 90
Oct. 12	N. F. Murray		145 49
Oct. 16	G. W. Waters		182 09
Oct. 16	J. M. Stedman		62 54
Nov. 8	S. H. Elkins		30 50
Nov. 8	S. H. Elkins		1 45
Nov. 8	John W. Hill		2 10
Nov. 13	G. A. Atwood		54 68
Dec. 5	Statesman		23 00
Dec. 17	Columbia Telephone Co		35
Dec. 17	Columbia Telephone Co		35
Dec. 17	State Poultry Association		100 00
Dec. 17	State Swine Breeders' Association		50 00
Dec. 17	Road Improvement Association		50 00
Dec. 17	L. F. Luthy		5 00
Dec. 17	H. J. Waters		8 30
Dec. 17	J. R. Rippey		12 48
Dec. 17	Snowdon Willis		9 55
Dec. 17	M. L. Blackwell		8 30
Dec. 18	John W. Hill		16 00
Dec. 18	D. A. Ely		3 50
Dec. 18	Geo. B. Ellis		9 00
Dec. 18	Norman J. Colman		15 00
Dec. 18	Alex. Maitland		8 80
Dec. 18	Thos. B. North		15 45
Dec. 18	Farmers' Institute Fund		855 22
		$2,367 94	$2,367 94

SUMMARY OF FINANCIAL STATEMENT.

Distribution of Annual Report Fund.

Date. 1900.		Dr.	Cr.
Jan. 1	To balance on appropriation	$150 00	
June 4	By vouchers paid		$150 00
		$150 00	$150 00

Monthly Crop Report Fund.

1900.			
Jan. 1	To balance	$165 78	
Jan. 1	To balance on appropriation	900 00	
Dec. 31	By vouchers paid		$896 05
Dec. 31	By balance with our treasurer		169 73
		$1,065 78	$1,065 78

Expense of Members' Fund.

1900.			
Jan. 1	To balance	$269 57	
Jan. 1	To balance on appropriation	550 00	
Dec. 31	By vouchers paid		$404 25
Dec. 31	By balance with our treasurer		415 32
		$819 57	$819 57

Farmers' Institute Fund.

1900.			
Jan. 1	To balance	$15 07	
Jan. 1	To balance on appropriation	1,900 00	
Aug. 1	By vouchers paid		$1,915 07
Dec. 19	By deposit by Secretary Rippey	855 22	
Dec. 19	By balance with our treasurer		855 22
		$2,770 29	$2,770 29

Office Expense Fund.

1900.			
Jan. 1	To balance	$82 39	
Jan. 1	To balance on appropriation	500 00	
Dec. 31	By vouchers paid		$511 17
Dec. 31	By balance with our treasurer		71 22
		$582 39	$582 39

State Veterinary Fund.

1900.			
Jan. 1	To Balance	$677 14	
Jan. 1	To balance on appropriation	10,100 00	
Feb. 7	To warrant No. 234 on Butterine Fund	38 00	
	By vouchers paid		$9,651 38
Dec. 31	By balance with our treasurer		1,163 76
		$10,815 14	$10,815 14

Butterine Fund.

1900.			
Jan. 1	To balance	$176 61	
Jan. 1	To balance on appropriation	3,950 00	
	By vouchers paid		$3,052 93
	By balance with our treasurer		1,073 68
		$4,126 61	$4,126 61

TREASURER'S REPORT.

To the State Board of Agriculture.

Distribution of Annual Report Fund.

Date. 1900.		Dr.	Cr.
May 4	To State warrant	$150 00	
	By vouchers paid and returned		$150 00
		$150 00	$150 00

Monthly Crop Report Fund.

1900.			
Jan. 1	To balance	$165 78	
Feb. 7	To State warrant	100 00	
April 4	To State warrant	100 00	
May 4	To State warrant	300 00	
June 4	To State warrant	100 00	
July 3	To State warrant	150 00	
Sept. 5	To State warrant	100 00	
Dec. 18	To State warrant	50 00	
	By vouchers paid and returned		$896 05
	By balance		169 73
		$1,065 78	$1,065 78

Expense of Members' Fund.

1900.			
Jan. 1	To balance	$269 57	
June 4	To State warrant	100 00	
Oct. 8	To State warrant	100 00	
Dec. 18	To State warrant	350 00	
	By vouchers paid		$404 25
	By balance		415 32
		$819 57	$819 57

Farmers' Institute Fund.

1900.			
Jan. 1	To balance	$15 07	
Aug. 1	To State warrant	1,900 00	
	By vouchers paid		$1,915 07
Dec. 19	To deposit by Secretary Rippey	855 22	
Dec. 19	By balance with our treasurer		855 22
		$2,770 29	$2,770 29

Office Expense Fund.

1900.			
Jan. 1	To balance	$32 39	
Feb. 7	To State warrant	100 00	
Mar. 8	To State warrant	50 00	
April 4	To State warrant	100 00	
May 4	To State warrant	50 00	
June 4	To State warrant	50 00	
Sept. 5	To State warrant	50 00	
Oct. 3	To State warrant	100 00	
	By vouchers paid		$511 17
	By balance		71 22
		$582 39	$582 39

State Veterinary Fund.

1900.			
Jan. 1	To balance	$677 14	
Jan. 3	To State warrant	900 00	
Feb. 7	To State warrant	1,000 00	
Feb. 7	To Warrant No. 234 on Butterine Fund	88 00	
Mar. 8	To State warrant	800 00	
April 4	To State warrant	500 00	
May 4	To State warrant	700 00	
June 4	To State warrant	1,000 00	
July 3	To State warrant	700 00	
Aug. 1	To State warrant	700 00	
Sept. 5	To State warrant	800 00	
Oct. 3	To State warrant	1,000 00	
Nov. 8	To State warrant	1,100 00	
Dec. 13	To State warrant	900 00	
	By vouchers paid and returned		$9,651 38
	By balance		1,163 76
		$10,815 14	$10,815 14

Butterine Fund.

1900.			
Jan. 1	To balance	$176 61	
Jan. 8	To State warrant	400 00	
Feb. 7	To State warrant	400 00	
Mar. 8	To State warrant	400 00	
April 4	To State warrant	300 00	
May 4	To State warrant	400 60	
Aug. 1	To State warrant	250 00	
Sept. 5	To State warrant	200 00	
Oct. 3	To State warrant	300 00	
Nov. 8	To State warrant	300 00	
Dec. 13	To State warrant	1,000 00	
	By vouchers paid and returned		$3,052 93
	By balance		1,073 68
		$4,126 61	$4,126 61

All of which is respectfully submitted.

H. H. BANKS, Treasurer.

State Fair Fund.

Date.	Warrant Number.	Name.	Dr.	Cr.
1900.				
April 4		To requisition on State Fair Fund	$425 00	
April 4	1	By Alex Maitland		$40 75
April 4	2	By Geo. B. Ellis		40 55
April 4	3	By N. J. Colman		29 25
April 4	4	By N. H. Gentry		35 80
April 4	5	By J. R. Rippey		36 30
April 18	6	By Geo. B. Ellis		1 75
April 18	7	By N. J. Colman		6 50
April 18	8	By Alex. Maitland		7 00
April 18	9	By J. R. Rippey		6 10
May 2		To requisition on Horse Breeders' Fund	500 00	
May 30	10	By Burckhartt & Rice		4 00
May 30	11	By T. O. Stanley		133 00
May 30	12	By J. R. Rippey		4 10
May 30	13	By N. J. Colman		6 00
May 30	14	By Alex. Maitland		6 00
May 30	15	By Geo. B. Ellis		2 50
Aug. 10	16	By N. H. Gentry		1 50
Aug. 10	17	By N. J. Colman		2 00
Aug. 10	18	By Geo. B. Ellis		3 75
Aug. 10	19	By J. R. Rippey		3 60
Aug. 10	20	By T. O. Stanley		56 50
Sept. 5		To requisition on Horse Breeders' Fund	2,000 00	
Sept. 11	21	By N. H. Gentry		124 00
Sept. 11	22	By N. J. Colman		8 00
Sept. 11	23	By J. R. Rippey		5 95
Sept. 11	24	By Geo. B. Ellis		3 75
Sept. 11	25	By Alex. Maitland		8 00
Sept. 19	26	By Menifee & Heck		1,500 00
Oct. 3		To requisition on Horse Breeders' Fund	2,000 00	
Oct. 16	27	By T. W. Bast		244 75
Oct. 16	28	By T. O. Stanley		103 25
Oct. 16	29	By Menifee & Heck		1,200 00
Dec. 13		To requisition on Horse Breeders' Fund	3,726 00	
Dec. 13		To requisition on State Fair Fund	9,316 00	
Dec. 13		By balance		14,342 35
			$17,967 00	$17,967 00

STATE FAIR TREASURER'S REPORT.

Missouri State Fair Directory.

Gentlemen:—

The following amounts have been received and paid out:

Sept. 13	1899	Received State Treasurer's check	$2,000 00	
May 1	1900	Received State Treasurer's check	425 00	
May 12	1900	Received State Treasurer's check	500 00	
Oct. 12	1900	Received State Treasurer's check	2,000 00	
Dec. 17	1900	Received State Treasurer's check	13,042 00	
Number of warrants twenty nine				
Total amount of warrants paid				3,694 65
Balance on hand				$14,342 35
			$17,967 00	$17,967 00

C. W. McANINCH,
Treasurer.

FARMERS' INSTITUTES.

ABSTRACT OF LECTURES AT FARMERS' INSTITUTE MEETINGS.

NATURE STUDY AND PRACTICAL AGRICULTURE IN RURAL SCHOOLS.

(Abstract of address delivered by State Superintendent Carrington at Farmers' Institutes).

Some years ago an educational awakening was felt all over this land. It had its influence on all classes of schools, but it affected least the rural schools. There were, however, two reasons for this. These schools are isolated and it takes time for movements to reach into the very heart of things. Usually rural communities are more conservative, are slower to accept new ideas and be moved by them. This is a matter of congratulation to them rather than one of reproach. By the time new things have been sufficiently tried and well formulated, the farmer is ready to accept whatever of good is left. This is true of what is called the new education. This manifests itself in many different ways, as its application varies. When applied to little children it is called the kindergarten, or the kindergarten method. When applied to conditions that exist in large cities it is called manual training and domestic economy. It was considered a fad when it struck the country under the name of object lessons. It revolutionized the teaching of science in high schools under the name of laboratory method. As library method it has taken firm hold on the teaching of history and literature. Congress recognized this some years ago in endowing an agricultural college in every State. Map drawing and diagraming are simple phases of the

same thing. Molding-boards, relief maps, drainage sketches are outgrowths of the same movement, away from the abstract to the concrete, from the routine memorizing of books to the study of "things." Nature study is the name of the newest and latest of these awakening movements and as it takes more systematic and practical bearing is called, "Practical Agriculture" in the rural schools. The old education, fine in its pedagogical forms and in its technical terms, did its work automatically. Indeed, there is much automatic work yet, even in our best schools. The absorbing powers of the brain are trained, but it does not cultivate the faculties of assimilation and initiation and almost wholly fails to develop the powers of original expression. In studying the functions of the brain, it has been determined that there are three classes of functions —the absorbing, the recreative and the outgiving. When there is little activity in the re-creating cell structure, the notion absorbed is given back, like in kind and form as that received. This process continued produces good habits, enables the individual to do many excellent things, and do them well, but it is not leading to the discovery of anything new; it follows the well-worn paths. What is aimed at in all these newer applications is a proper stimulation to all functions, the perceiving, the seeing of things in proper relation and the arranging of things to form new concepts, and, withal, an all-round development which will individualize every child and make him a self-determining agent, a self-directing activity.

Missouri has need of a larger population of independent thinkers; we need a higher development of our material resources. Speaking both literally and figuratively, we want more men who can make two blades of grass grow where now there is but one. As many as we now have, we want more good homes in which there are evidences of comfort, culture and refinement. We boast of our material progress sometimes forgetting, I fear, that a great State, a great civilization, consists more in its men and women, men and women of great heart power, of great refinement and culture and of mental activity and physical endurance. Our forests, great sources of wealth, are exhaustible; our mineral resources are seemingly inexhaustible, yet the time will come when every miner must move to a new camp. Not so with the farmer. He who lives by tilling the soil may, when he has learned to wrest from all the elements those things necessary to his success, gather rich harvest and leave his soil

in better condition from year to year. Looking, then, to the future of Missouri, we should not expect to count it greatest in cities, in manufacturing, in its commercial enterprises, in its mineral productions. As great in these as it may be, it should be greater in its productions from the soil, in grain and grass, in fruit and stock. The tillers of the soil are and must continue to be more than "the man with the hoe." It takes seeing and doing and thinking to succeed in agricultural pursuits now. It will take more and more as the years come and go. What we would have in our rural communities then, we must put into their schools. If we would have practical, progressive farmers who grow wiser and richer from year to year, we must give the boys in the schools training that points that way. If we would have good housewives who can gather around them things artistic as well as useful, the girls must have lessons in the school to prepare for this.

There is sentiment to the effect that an educated man is impractical. The worst of it is that there is some foundation for this belief. On the other hand, there are those who believe a practical person can not be cultured and refined. The man who studies books, gets his opinions second-hand, whose inflamed imagination leads him to shun labor and all contact with those who labor, has been considered by some the educated man. It was the old Greek idea that an education was an ornament. The newer idea is that education is for the purpose of enabling him who has it to accomplish more, to do more, to feel more, to have more of the attributes of a creator and less of the dependent. The savage is devoted to ornamentation; the civilized man, to service.

No person is prepared to render the State, society or himself high service until his entire being is developed. In the schools, the teacher must first appeal to the children's senses, their powers of observing, of seeing and doing. These seeing and doing processes naturally lead to the essential mental processes. Under the judicious stimulation thus given them, reading, literature, arithmetic and geography become living movements in the school. There is no successful teaching of numbers that is not concrete. When children handle and measure things there is an interest to them that is not found in the abstract. To him who has studied the heavens, delightful associations cluster around the many beautiful references, in classic literature, to the stars and their constellations. In geography how teach the points of the compass without actual

observation of the north star and the movements of the heavens? Which is better, to send children to books for all they know about rain, snow, dew, frost and fog; or to the fields, meadows, pastures, hills and valleys? Do not say that children know these things; they do not until systematically observed.

Much of what is best and most inspiring in literature is wholly unappreciated by those who are not in touch with nature. What point is there to Holmes' famous "Did you ever see a crow with a kingbird after him?" to one who had never seen a crow fly nor watched the movements of the kingbird? Who without keen senses can picture the times and scenes of George Eliot's "The elder-bushes were spreading their summer snow?" The student of nature is delighted with such; but it shoots high over the heads of the matter-of-fact pupils who know little of nature. To those who know not the oak, and many do not, Lowell's expression "Thy steadfastness rounded with leafy gracefulness" carries with it little meaning, and any attempt to read it is but a stumbling over dead things.

Nature study is not wholly new. As a method of study it has long been practiced by the best teachers. But as a systematized subject to be taught in and of itself and for its own sake, it is of very recent practice. In the development of the new education, the whole method was one that necessarily took the child to things natural. Another view has arisen: Can nature study be so organized as to supplement and correlate with reading, literature, language, geography, drawing, etc., and at the same time gradually give that knowledge and training necessary to practical tilling of the soil? If so, it will begin in the primary grades as a method and will serve the exalted purpose of adding interest and more adequate conceptions to every phase of rural school work. It will give definite purpose to language. Language lessons mean something to children when used to express their own experiences and observations. Doing becomes a pleasure when their own plans are wrought into it. If, however, the study of nature serves so important a purpose in supplementing other educational processes, these other processes may serve just as important a purpose in supplementing nature study. We are pleading for the study of nature (1) to bring new life into the school, to substitute rational methods for automatic teaching, to give children some conceptions of realities, and (2) to prepare for the careful study of agriculture later in the course. Children may as well learn about the soil, its composition

and conditions necessary to production; may as well study climatic conditions and that upon which they depend; may as well study the nature of plant life, its great variety, its habits of growth and its uses; may as well study insects, their relation to plant life and to climate and their purposes in the great economy of nature, when to do so means more thorough work in literature, in language, in geography, in history, in all essentials.

Every school exercise should look to both the cultural and the practical. To emphasize either of these elements to the exclusion of the other would be a mistake. Better results will be obtained in both when they are duly combined. With this end in view the State School Department has issued a course of study emphasizing nature study correlated with literature, history, language and geography. With an intelligent adaptation of this course to the local conditions it will lead to the study of practical agriculture in its highest and best sense.

The Legislature in 1899 made "practical agriculture" one of the required subjects for a first grade county certificate. It is also required for a state certificate. This stimulates the study of agriculture and horticulture in the summer schools for teachers. Missouri is taking advanced ground in this matter. Within the past year, all three of our state normals have added this subject to their curricula. The State Superintendent reaches about three thousand teachers every month through the Missouri School Journal with outlines and suggestions. A small appropriation for this purpose would enable him to put a small circular each month into the hands of every rural teacher in the State.

While much may be done to improve farming by other means, certainly the best way to accomplish that result is to teach the children. Through the schools, the public must be made to understand that intelligent farming pays, that men and women of culture may be found tilling the soil. Teach children to observe, to think and to feel through the study of nature, through the solution of practical problems and through reading good literature and soon we will have more prosperous farmers, more cultured and refined homes on the farm.

Let us make our rural schools such as will hold the children in school longer, and the parents who are ambitious for their children on the farms. Rural High Schools are important. To secure these it will be necessary to reorganize our school districts and find some way of equalizing the

burdens of taxation and the privileges for the children. We must adopt some uniform system of grading and classifying the rural schools and thus inspire the children with higher ideas and ambitions.

INDUSTRIAL EDUCATION.

Kirksville, Mo., February 1, 1901.

HON. GEO. B. ELLIS, Columbia, Missouri.

Dear Sir:—I have your request for a copy of the address delivered by me before a number of the farmers' institutes last August and September. All my addresses were extemporaneous. They were similar to several heretofore published in your predecessor's annual reports. They were expressions of a firm belief in an extensive system of industrial education including agricultural and horticultural education for the children living in villages and rural communities. This conviction has been growing in the minds of thoughtful men for many years. After advocating this modified system of education for many years before all sorts of audiences and in all parts of Missouri I found myself a few months ago in a position where opportunity was in some measure given to put my ideas into execution. The institution over which I preside usually has from 400 to 450 students in attendance. These students are prospective public school teachers of Missouri. A large majority of them teach in rural and village schools. It therefore became apparent that here was an opportunity to prepare teachers for giving instruction in agriculture and horticulture in the schools of the people. We have therefore fitted up a room which we call our agricultural laboratory and secured for a teacher, Miss Carrie Ruth Jackson, who has spent several years in the agricultural and horticultural departments of the Missouri University. We first gave Miss Jackson six good cutting tables, each three by eight feet and about six inches deep. Sand, clay and humus were furnished and the soil was mixed by the students. We also secured some twenty-seven soil tubes varying in height from three to thirty-six inches. We also secured scales, test tubes, spirit lamps, thermometers, microscopes, a milk tester and many other appliances. With these we made our start last September. During the first five months Miss Jackson had about

75 students. These were grown men and women in the freshman year of our school who expect, within the next year or two, to be engaged in teaching in rural and village schools. The course in agriculture is a ten months' course. About two-thirds of those who were in the beginning classes are at this time, January 31, still in the classes. At the reorganization, a day or two ago, some 35 others joined the classes so that the whole number of Normal students at the present time taking these lessons is about 85; but we have 25 girls and boys averaging about thirteen years of age who are also taking these lessons, just such girls and boys as you would find in the arithmetic and grammar classes of the country schools. In addition to the in-door laboratory work thus far carried on we, in the fall, plowed up about an acre of ground which will be used next spring for a variety of experiments. We have one small plot of ground in a low place which we have also plowed up and which we shall make the basis of some experiments in tile draining next spring. We do not follow any text-book though we *have* many text-books which we use for reference.

I am pleased to state to you at this time that this new departure has met our most sanguine expectations. As a better description of the work than I can give I beg leave to submit for your readers the following brief synopsis furnished me by Miss Jackson:

"I shall attempt to give in as brief a way as possible an outline of the kind of work being done in this department and how. First, we use no text-book; instead the student has access to a number of Bailey's books of the "Rural Science" and "Garden Craft" series, publications from the various experiment stations throughout the United States, the Experiment Station Record, Year Book and many other valuable publications from the United States Department of Agriculture.

The daily class work consists of lectures and experiments, experiments being made by the student in connection with the subject in hand. In a measure, the student demonstrates for himself the conclusions reached. In connection with the study of the soils, experiments were made in determining the water-holding capacity of different soils, the time of percolation of water through sand, clay and humus, the amount of evaporation from soils under different conditions of cultivation. This was carried on by means of a set of soil tubes which were filled with the same kind of soil and packed similarly. In one of these

the soil was uncultivated, in the other two it was stirred to a depth of two and four inches, respectively. Water was supplied to the soil from small reservoirs at the base of the tube. Tubes were weighed often in order to ascertain the amount of water lost from each. Other experiments showing the amount of moisture in plants and the amount of water evaporated through the leaves of plants, were in turn taken up. The subject of rotation of crops was discussed in class, also leguminous plants, their value as nitrogen gatherers, and as forage crops. Roots of beans, peas and clovers were examined for tubercles. Experiments with soil inoculation were made. Soy beans were planted in two jars containing sterilized sand, one of which was inoculated with soy bean bacteria and jars given similar conditions.

"Some work in dairying was done by means of the Babcock milk tester. Different samples of milk were tested to ascertain the percentage of butter fat. New milk and old milk were tested to determine the degree of acidity in each case. Under the subject of the propagation of plants the principal methods of propagation were considered. Experiments were made with seeds in determining the conditions necessary for germination. They were germinated under differnt degrees of temperature, conditions of moisture and air. Some soft wood cuttings have been made and are now growing in the cutting bench which is furnished with bottom heat by means of steam pipes. Work in the hot bed will soon be commenced. The making of hard wood cuttings and grafting is some of the work to be done in the early part of February. Ground has been prepared on the campus for the growing of vegetables, grafts, grape cuttings and flowers. The designing and planting of flowers, shrubs and vines on the campus will be done by the class."

Regretting my inability to reproduce the speeches delivered and trusting that the above brief description of actual work is of even greater use, I am,

Very respectfully yours,

JOHN R. KIRK.

NOTE.—If all our State Schools that prepare teachers for work in the rural schools, will provide instructors along the lines suggested in the above article, it will only be a very short time until the teaching of Agriculture in a practical way will be in operation in every county in the State.

PLANTING AND MANAGEMENT OF AN ORCHARD.

PROF. J. C. WHITTEN, Horticulturist State University.

Location.—The best fruit lands are usually comparatively high, dry and well drained. There should be surface soil enough to produce a fair growth but the land need not be especially rich. The character of the subsoil is perhaps of more importance than the surface soil. The subsoil should be sufficiently open to admit of good water drainage below and to enable the roots to readily penetrate it. Atmospheric drainage, to allow the cold air and fog to drain off is more essential than water drainage, though usually when one secures the one he has the other. While comparatively high land is best, sometimes somewhat low land, such as second bottom, may be very good if there is an adjacent outlet for water and cold air that is still lower. Near a moving stream, which carries off cold air and radiates heat on a cold night, to prevent frost, one may plant much nearer the bottom of a slope than he could if the valley were a dry one.

Varieties.—Among the apples generally best adapted to Missouri may be mentioned the following that are cosmopolitan in their adaptability to all parts of the State: Ben Davis, Gano, Jonathan and York Imperial. Others that are profitable in many parts of the State are Winesap and Mammoth Black Twig, which are splendid keepers; Huntsman and Grimes, two of the best yellow apples and of the best flavor; Ingram, Rome Beauty and Janet, which are adapted to low ground and others that one may find succeed in certain places.

Trees.—The majority of growers prefer fair sized one-year-old trees for setting in the apple orchard. Some like large one-year-olds and occasionally a man wants three-year-olds. Generally speaking, a fair sized, well grown tree, that has done well in the nursery and is in good health is all right for planting. The height at which the trees should make their heads is a question upon which there is a difference of opinion, but the majority in this western country prefer low heads so the branches will soon shade the trunks and so the trees may be more readily pruned and managed from the ground. Trees should have straight central trunks and be symmetrically headed.

Shaping the Trees.—While a great many methods of pruning at the time of setting have been suggested, the usual method is to trim the roots enough to remove any ragged parts and to shorten in any long roots that may not have been cut neatly by the tree digger, and to shorten the branches somewhat, say to one-third or one-half of their length, leaving the main trunk intact, unless it is very long, when it may be cut back. In any case the main trunk, or leader should be left longer than any other branch of the tree, to maintain an upright growth, thus securing a straight tree. If this leader forks it is best to cut one side of the fork back to a short stub of a few buds. If a branch occurs below the point where the head is to form it should not be cut off close to the body of the tree unless it is small, but should be shortened to a stub at first so it will not make much growth, and removed after the tree has become established. Subsequent pruning should consist in shortening any side branches that tend to outgrow the leader, in keeping the tree symmetrical, in removing any branches that cross and injure each other and in taking out broken or diseased limbs. Usually those who prune, prune too much for this section of the country. It is best not to remove a branch unless it is necessary to secure the symmetry or health of the tree. Pruning should mostly be done in late winter unless one is well skilled in managing orchard trees when summer pruning may sometimes be resorted to.

Planting.—A good average distance apart to plant is twenty-five feet each way. For special reasons this distance may be varied. The trees should usually be set about the same depth at which they stood in the nursery. The soil should be made firm around their roots as it is put into the holes.

Cultivation.—This is the most important feature of the treatment of an orchard. In general the trees should be given clean culture the same as corn or any other cultivated crop. It is well, however, to occasionally plow in some vegetable matter into the soil to render it more resistant of drouth and to keep it from washing. This means that some other crop than the trees may be grown in the orchard. In small home orchards any of the small fruits may be grown between the rows. On large areas corn is a good crop to grow providing the land is rich enough to produce a good crop and does not wash too badly. If corn is grown, plenty of space should be left for the trees to make their full spread of branches

each year. That means, say, four feet the first year and a slightly larger space after that. Rye may sometimes be sown after cultivation ceases in late summer, and turned under when cultivation begins in spring. Where land is rich and resistant of drouth, or where it is so steep as to wash badly, an orchard may sometimes be sown to clover for a year or two at a time, to hold the soil and to add humus to it. As a rule, however, it is best not to use any crop except clover, that will not admit of clean cultivation. In many cases it is well to rotate with different crops, having a part of the orchard in one thing and a part in another. This enables one to harvest only one section of the orchard at a time and to have a succession of different feeds if hogs are used to eat the orchard crops. While clean cultivation should be the rule aimed at, it must be remembered that one must vary from this plan to suit his individual conditions and to grow those crops which will best suit his particular needs.

NEW REMEDIES FOR BITING INSECTS.

[Abstract of talk on injurious insects.]

PROF. J. M. STEDMAN Agricultural College.

For many years, the best substance we have had with which to spray our various garden, orchard and farm crops, in order to kill all the destructive insects that take their food by biting away, chewing and swallowing the tissues of the plants on which they work, has been Paris green. This substance is made by the manufacturers for the purpose of spraying or dusting on various plants in order to kill the insects, and consists of arsenic, which is the active poison, in chemical combination with copper. This combination renders the arsenic insoluble in water, and, therefore, does not injure the plants, as pure arsenic, which is soluble in water, will do. The Paris green is simply suspended in the water which acts as a carrier only. You are all aware of the fact that when it is mixed with water and then allowed to settle, which it does with rapidity, that all the Paris green is then found at the bottom of the tank, and none of it dissolved in the water. Hence it is necessary to keep this stirred constantly while spraying. If the Paris green be perfectly well

made, it should not contain any soluble arsenic; but as a matter of fact, in the process of its manufacture, some little arsenic is apt to enter that has not become chemically united with the copper, and as this soluble arsenic is sure to injure the plants sprayed with it, we add freshly slacked lime to the mixture in order to counteract its action and prevent the injury. Pure Paris green should contain about 50 per cent arsenic, all of which is chemically united with copper and rendered insoluble in water.

But as Paris green became of such general use as a spray against injurious insects, some one began to adulterate it with a less valuable substance. This adulteration soon became so extensive that one could not depend upon getting Paris green that contained the 50 per cent arsenic; and, hence, when he made the spray mixture with the proper proportion of Paris green, he was not sure he had the proper amount of poison, and when applied to the plants, the insects would not be killed. The extent to which this adulteration has been carried, may be imagined, when I tell you that one sample which came under my observation, did not contain a single trace of Paris green or of any other poison. This so-called Paris green was nothing but plaster of paris colored green by indigo and chrome yellow, and it looked exactly like good Paris green. Of course, this was perfectly harmless to insects or plants, and was an extreme case of adulteration. One can find all degrees of adulteration in the markets.

London purple is even less satisfactory than Paris green, and is not only likewise adulterated, but even when pure it can not be depended upon, since it is a refuse matter from the manufacturer of aniline dyes, and is not made for London purple, and hence its chemical composition varies. I have never advised the use of London purple on this account.

The extensive adulteration of Paris green and London purple, and the consequent financial loss to the persons using it, led several states to pass a law requiring that Paris green and London purple contain 50 per cent arsenic. While this was done in good faith, so as to bring up the poison to the proper standard, we have now encountered an even greater danger than the want of the proper amount of poison. Some on finding that the Paris green or London purple does not contain the proper amount of arsenic, add pure arsenic to bring it up to the 50 per cent. In this way the law is fulfilled, but this addition of pure arsenic,

which is soluble in water, kills the plants to which it is applied, and we, therefore, do ourselves more harm than the insects we are trying to kill. Hence I would advise you never to use Paris green or London purple again.

Fortunately, we now have a substitute for Paris green and London purple, and one that is just as cheap, and the exact composition of which we know. It also has the additional advantage of staying suspended in the water much easier than the other two substances. I would, therefore, advise you to use *arsenate* of *soda* hereafter for all *biting insects. Do not purchase this substance,* but make it yourselves, as follows: *Arsenate of soda, for biting insects only,* should be made by you individually, by adding two pounds of powdered white arsenic (pure crystalized arsenic ground to a powder) and eight pounds of sal-soda, to two gallons of water. Make a mark on the vessel indicating the top of the contents, and place it on the fire. When it begins to boil note the time and keep it boiling for fifteen minutes. The liquid should now be perfectly clear, although it may be colored a little, and should not look milky or have a sediment in it. Remove it from the fire and add water to bring it up to the original two gallons, which you can readily do by the mark you made on the side of the vessel. If this be not done, crystals will form when it cools. After it is cool, if the liquid look milky or a sediment is found at the bottom, it shows that either the arsenic or the sal-soda was not pure. You can now place this substance in a suitable jar or bottle, and label it, and place it where no one will get at it. When you desire to spray, slack eight pounds of fresh stone lime in a little water to form a lime putty or thick lime. Place this slacked lime in one hundred gallons of water, and then add two quarts of the arsenate of soda from the bottle, and after thoroughly mixing, it is ready for use. Two quarts of this arsenate of soda in the bottle is equivalent in poisoning properties to one pound of pure Paris green, and should be so regarded in adding it to the water. Sometimes it is well to use only fifty gallons of water, as on potatoes; while in other cases, as for codling moth, it should be used in one hundred and fifty gallons of water. Whatever amount of water be used, you should always use eight pounds of fresh lime for each two quarts of the arsenate of soda.

There is another substance known as *arsenate of lead* which is also used to take the place of London purple and Paris green for biting

insects, and which requires no lime. You will have to make this yourself the same as the arsenate of soda. Dissolve four ounces of dry commercial arsenate of soda and eleven ounces of dry commercial arsenate of lead in one bucket of water; allow this to stand over night when arsenate of lead will be formed. The contents of this bucket are then to be added to fifty gallons of water. This is very fluculant and requires little stirring, and one can readily see where he is spraying without the addition of lime.

COMMERCIAL FRUIT GROWING.

By Hon. N. F. Murray, Oregon Mo.

In presenting this subject to the farmers it is not our purpose to attempt to advise them to quit farming and go into fruit growing for our markets. It would certainly be a great mistake for them to do so. But we are quite sure that many of the farmers of Missouri could engage in growing some of our standard fruits in connection with their farming to a very great advantage.

It often occurs that the farmer finds himself on a small farm with several sons to assist him and he finds his acreage too small to furnish profitable employment to all in growing cheap grain crops. Sometimes he is tempted to run deeply in debt to buy an adjoining farm in order to keep his sons with him.

In such cases it would often be much better, safer and more profitable to plant out a large orchard of good winter apples, mostly Ben Davis, and grow them for market. Some may offer the objection to this that it takes too long to reap a return for the money and labor invested. But you should look upon the improvement as an investment which will add greatly to the value of your farm year after year as the trees grow up to a bearing age. By cultivating corn in the orchard for the first five years and cutting it up for fodder you can get almost full crops, certainly enough to pay for your work and a rental value on the land. This leaves the growth of the trees clear profit on your investment.

If you plant twenty-five feet each way, you will have sixty-nine

trees to the acre. At the end of five years your trees will begin to bear some fruit, and will at a conservative estimate be worth three dollars each, and counting fifty to the acre, your land has advanced one hundred and fifty dollars per acre by the growth of the trees which only cost you five dollars.

I speak from experience. My two sons and I have twenty thousand trees in orchard. We grow corn in the orchard where the land is rich (in one we grow berries), where the land is thin we give a top dressing of barn manure about the trees and sow to red clover, cultivating for a few years a strip along each tree row and pasture stock hogs on it—sometimes calves.

Some years we cut first crop for hay and leave the second crop to fertilize and re-seed the land and in this way we are making as much clear money from the land as our neighbors who do not grow commercial orchards.

At five years we get from a peck to a bushel of apples per tree. One year we sold the apples from a seven-year-old Ben Davis orchard for forty dollars per acre and we were at the same time reaping a profit from the clover eaten by hogs and calves, and building up the fertility of the land. Last year we netted forty dollars per acre from the blackberries in one orchard six years old.

We never have any trouble to sell our fruit, and the more and the better the fruit the easier it is to sell it and usually our heavy crops bring the highest price. In 1890, we sold to New York buyers at two hundred dollars per acre, on account of a lighter crop in the East.

I am aware that some fear an over-production of fruit. I do not and you farmers need lose no sleep over this question if you will consider the limited area of the fruit producing country; the short life of our orchards; the wonderful increase in population; the great cities of our own and surrounding States; the ability and the desire of the American people to buy and consume great quantities of fruit; the settlement and building up of new markets in the Northwest, where they can not grow fruit; the great increase in foreign demand for American apples; and then add to all this the fact that Missouri apples are superior to all others which is attested by the numerous gold medals and first prizes they have won at the great expositions in this country and Europe. With all this before us, where is the man who can longer fear an over-production of

Missouri apples. I am honest with you farmers and if I were in fear of an over-production of fruit I certainly would not, with an interest in an orchard of twenty thousand trees, be here encouraging you farmers to grow fruit to sell in competition with that from our own orchards.

On many farms, peaches may be grown with a good profit. We now have a number of good budded varieties that are more hardy than the old time varieties. We have three trees of Champion in our garden that have borne five crops in the last six years. One thousand like them, which may be grown on seven acres of land, would in the last six years have netted us five thousand dollars. In former years we made money out of peaches. One year we netted three hundred dollars per acre. Some of them we wrapped in tissue paper and shipped to territories that netted us five dollars per bushel. We have so much faith in peaches for profit that we have in the last two years planted six thousand trees in Northwest Missouri and will plant more.

It is never any trouble to find a market for peaches, in fact, we have never at any time had half enough to supply the demand. You farmers can grow them just as cheap and easy as you do oats if you will go about it right and plant only a few of the best varieties.

I am aware that some may say that Murray is a nurseryman and has trees to sell. Yes, that is true, but we never have any trouble to sell our trees and our best customers are men who we have, from time to time in the last thirty years, persuaded to plant large commercial orchards.

After next spring I will retire from the nursery business and devote my whole time to my orchards, for the reason that there is more money in growing fruit for the market than there is in growing nursery stock.

THE FARMER'S ORCHARD AND FRUIT GARDEN.

By Hon. N. F. Murray, Oregon Mo.

Ladies and Gentlemen:—You have heard some eloquent addresses from the lips of the distinguished gentlemen who have preceded me. They have told you in forcible terms of the great importance in stock

growing, of furnishing the animal comfortable quarters, clean water and a well balanced ration. These gentlemen are practical men and understand their business. They have found by experience that in order to produce a fine healthy animal, with good bone, well developed muscles and fair flesh, they must give it a variety of food.

Now I have no fault to find with their lectures and I am confident that you farmers may profit by heeding their advice. But I believe that man, who was made in the image of his Creator, and but slightly lower than the angels of Heaven, is entitled to our first consideration, our best thought and the most complete ration that the mind of man can devise. While we are proud of our farms and our herds of stock, yet we should be prouder of our children; the boys and girls that are growing up in our homes. It is an impossibility to raise healthy well developed children without a variety of food, a well balanced ration and this in part must be made up of fruit and vegetables. In no other line on the farm will the same money bring so much genuine comfort, health and happiness as that which is judiciously spent in fruit growing.

We deem it not only a privilege but the duty of every farmer to furnish his family with an abundant supply of good luscious, life-giving fruit the year round. This may be done by planting liberally of apple, peach, pear, plum, cherry, grape, strawberry, raspberry, blackberry, current and gooseberry. It is seldom, if ever, that all of these fruits will produce a crop on the same farm in one season. But having some of all these in bearing you are certain to have an abundant supply from some of them each year, and if all, or most of them chance to bear a heavy crop this will be the time to can and dry a good liberal supply for the off years when the crop is light.

In selecting a location for the farmer's orchard and fruit garden it should be covenient to the residence, but if possible avoid replanting the old orchard with the same kind of fruit. In fruit growing it is best to follow a rotation, the same as growing grain crops. The land should be rich enough to grow a number one crop of corn. If it is somewhat sandy and underlaid with a porous subsoil, no under-draining will be necessary. But if it is heavy and inclined to be wet and hold water, then it should be tile drained before planting.

Prepare for planting by plowing the ground good and deep in autumn. In early spring, lay off the orchard plat with a plow, both

ways, the distance you desire to set your trees; plant a tree at each crossing. When the ground is in good condition, set no deeper than the tree grew in the nursery, keep top perfectly straight and firm the earth well around the tree to hold it in place.

Plant apples, twenty-five or thirty feet each way; peach and plum, one rod; pear and cherry, twenty feet; grape, eight feet; raspberry and blackberry, rows eight feet apart and plant three feet apart in rows; strawberries in rows three feet apart—plant one foot apart in the rows and let them grow in matted rows. If you choose you may plant all the berries in the young orchard, as a partial shade is beneficial to them and the berry plants will make a winter protection to the root system of the trees. When the orchard gets up large enough to shade the berries too much, they can be cleared out and a new patch planted, in fact most all berries must be renewed.

Strawberries will run down and need renewing in three years from planting; raspberries in four to six years, owing to variety and care; blackberries will last longer and are more difficult to kill out, for this reason it will be advisable to plant them in a patch to themselves on good deep, rich, moist land. All young trees and plants should be cultivated thoroughly. All kinds of vegetables and sweet corn may be grown in the family orchard.

Buy your trees and plants from your home nurseryman or send direct to some responsible firm for them and by all means avoid the irresponsible tree vender who talks long and loud about whole root trees, blight proof pear trees, hardy peach on hard maple, curculio proof plum trees and the great superiority of his trees over all others. The work of this class of men is doing more to discourage the farmers from growing fruit than anything else.

To protect the fruit from insects keep plenty of poultry, at least fifty chickens for every acre, and more would be better. Cultivate all your trees and plants in early spring and summer and turn the chickens in and keep them in until the fruit begins to ripen, then if they are damaging it, turn them out. Turkeys are also good to hunt and destroy insects, especially grasshoppers. I know from experience that this is the best, cheapest, most effectual and economical method for the farmer to protect his fruit from the ravages of the codling moth, canker worm, plum curculio and a host of other insects.

To protect from rabbits and sun scald put on wooden tree wrappers as soon as the trees are planted. They are put up in bales of one hundred each. Wet them before using and place one around each tree and fasten it with a light wire at each end.

To protect from borers take the wrappers off early in June, when wet so they will not split, and wash the bodies thoroughly with a wash made of white lime (a regular whitewash) and to every bucket of this add one-half ounce of crude carbolic acid and one-half pound of fine sulphur; stir well and put on with a brush or a swab made of rags, and then replace the wrappers. Keep this up for several years until your trees get up to a good size.

Get your wife, the boys and the girls all intensely interested in the fruit and poultry on the farm and be sure to let them share in the profits. Do this and in a few years you will be agreeably surprised at the result. You will find your family more healthy and vigorous and better pleased with farm life than ever before. You will see your doctor bills grow less, your grocery bills vanish and your bank account grow larger.

SOY BEANS AND COW PEAS.

By Jas. H. Chenoweth, Lathrop, Mo.

I have been growing Soy beans and cow peas for only four or five years, so I will not attempt, neither will you expect me, to tell you the best methods of planting, cultivating, harvesting, etc. I can simply give my experience and other information obtained by studying and reading of them.

Soy beans and cow peas belong to the leguminous family of plants and are to the South what clover is to the North and alfalfa is to the West. My experience in growing them has been so full of interest that now I am enthusiastic, and think every farmer should be interested in them, and that they should be grown to a greater or less extent on every farm. Being a warm weather plant they should not be planted too early in the spring—wait until the ground warms up and in good condition to work. Plow and pulverize the land well.

For a seed crop I have had best results when planted from June 1 to July 1. Of course the later and coarser varieties should be planted earlier to insure them reaching maturity before frost. The earlier kinds may be delayed in planting until July 10, or even later, depending of course upon the variety of seed used and the length of the season. For seed I have good results by planting in rows about thirty inches apart and cultivate lightly. This season I have cultivated with a weeder with great satisfaction. I planted with a one-horse corn drill or with ordinary corn planter. The planter I use is adjustable and can be taken up until the shoes, or runners, are only thirty inches apart. The ordinary corn planter will do very well by planting over the field once and then going over the field again, planting between the rows. Plant very shallow if soil is moist. Later in the season, or in midsummer, when the ground is very dry, they can be planted deeper.

The Black, or Nigger cow pea, yields the most seed and also produces the most forage of any of the ten varieties with which I have experimented. The Blackeye is the earliest and produces a large amount of seed also. I have secured as high as twenty-five bushels per acre from Black and but fifteen to twenty of Blackeye. The Whippoorwill seems to be the best known and the most sought after, although for me it produces less seed and less forage than the Black and is not so early as the Blackeye.

Last year immediately after cutting oats, I plowed and prepared twelve and one-half acres of stubble and planted the Blackeye cow peas and dwarf Soy beans, in rows thirty inches apart, cultivated once. They were ripe October 1, when hogs were allowed to run in the field all fall and winter to harvest the seed, which they did in a very satisfactory manner. I took the same field this year and sowed to oats again; after harvesting oats the ground was too hard and dry to plow, so waited two or three weeks for rain. I finished planting the last week of July. This year I planted in rows fifteen inches apart and gave no cultivation and the peas and beans are doing fine and are twelve to eighteen inches high and if pasture becomes short, I will turn cattle on and make pasture of this crop. If I don't need them for pasture I will let them seed and hog them down this fall and winter. This is the second crop grown on this land this season and has been planted only six or eight weeks; where clover would have taken fifteen months to have produced such a

crop as this and I consider that I will be this fall just where I would have been next fall, had I sown clover with my oats last spring. For hogging down I have planted dwarf Soy beans and Blackeye cow peas mixed, in rows fifteen inches apart, about July 1. They made a very heavy yield of seed and were ready to turn hogs on September 1.

Under ordinary conditions Soy beans will yield fifteen to thirty bushels of seed per acre. I have secured twenty bushels per acre from land of moderate fertility, and on better land, have harvested as high as thirty to thirty-five bushels. Soy beans have a very high feeding value.

After very careful tests, the Kansas Experiment Station has demonstrated that the Soy bean is three times as valuable as corn for fattening hogs—or where corn is worth thirty to thirty-five cents, Soy beans are worth $1 per bushel. I have made no actual test whereby I can give you any figures, but my feeding them has demonstrated to me time and again their superior qualities.

Last year in August, I turned one hundred and forty hogs, all ages, into an eighteen acre field of cow peas and Soy beans and gave no other feed for six or eight weeks. The hogs seemed to be the best contented lot of Poland Chinas I ever saw.

I have planted Soy beans in corn, but they did not succeed very well, too much shade, being of an upright or bushy nature they grew too spindling and weak, consequently fell down and made no progress. On the other hand, cow peas planted in the corn, not too late, seemed to be a success; having a twining or climbing nature they would run up the stalks for air and sunshine. Cow peas planted in corn at second cultivation, or when corn was eight inches to one foot high, had run up the stalk and were ripening considerable seed at the time the corn was ready to cut. I would recommend this as a profitable practice especially where corn was intended for fodder and to be cut with a corn binder. The cow peas being more valuable than clover would add considerable to the value of the crop of fodder. I would also plant cow peas for forage in corn immediately after laying it by, to be pastured down while pasturing the stalk field. Horses, cattle and sheep are very fond of the pea vines.

Soy beans, if cut soon after blooming, make a very desirable hay or forage and are much easier handled than cow peas. If allowed to stand until nearly ripe and cut, cured and stacked, they make a fine field for

hogs in winter by feeding them out in the straw and letting the hogs do their own threshing. The grain binder is a very good machine to harvest them with or they can be cut with mower and raked into windrows with a rake.

Now a word in regard to seed. If possible secure seed from same locality in which you intend to grow them; thus insuring a crop, because of acclimated seed. Don't imagine that because you have cow peas or Soy beans they will produce just what you expected. If you want hay or forage, plant the larger and coarser kinds that grow upright and off of the ground. The medium variety of Soy beans, Black cow pea, or New Era pea, are excellent ones for that purpose. For an early seed crop the dwarf variety Soy bean and Blackeye cow peas are choice varieties.

For hay, cut Soy beans when in bloom; cow peas at any time and treat in every way the same as clover. For seed, Soy beans and cow peas can be threshed with an ordinary separator by removing concaves and substituting planks or boards and running the machine at slow speed. Until other machinery is invented, live stock, and especially hogs, can thresh peas and beans cheaper than I can. So for this reason I will flail out a few bushels for my own seeding and let the calves, hogs, sheep, etc., eat the balance of them from the straw unthreshed.

DAIRYING IN MISSOURI.

By John Patterson, Kirksville, Mo.

I look for the people of our State to take up with dairying as a business more and more after this, because it gives better immediate pay than any other branch of farming, and because in following dairying the fertility of the farm will be improved. To make the cows do well, they must be kept in a good comfortable place, which should be cleaned every day, and every farmer knows the benefit the manure brings to the poor places of the field. A dairyman is thus encouraged to make and save and apply more to fertilize his whole farm, and if he goes over it in rotation, he can make enough to give his land a good dressing once every six years, or one sixth of his land every year.

Every farmer that contemplates going into dairying must first examine himself to see if he is or can become fit for that business. He must first make up his mind to be good to his cows and calves. He must learn to feed them well and keep them comfortable. If his cow should kick, he must not act the mule and kick back, but must take his chances to get her milked while she kicks. If he hires help, he must teach them also to be kind to the cows. After you learn how to feed and care for your cows, see if they give milk of sufficient quantity and richness to pay for their feed and care. A cow well taken care of should produce one pound of butter every day for nine months of the year. Most dairymen require a cow to produce three hundred pounds of butter a year. If this butter is made right and sold in the right market, it should net sixty dollars, and the calf, which could be raised principally on skim milk, should be worth fifteen dollars, the cow, therefore, making a total earning of seventy-five dollars a year.

The question always comes up, what breed shall we use to make this amount of butter? I would answer that no breed has all good cows and there are some good cows in most breeds, so whatever breed you have, you must pick out the poor cows and dispose of them. If you raise all of your cows, half of them will be heifers and you should keep the heifers until they have their second calves, for at that time they will come nearer paying for their feed, and if they fail to do this, sell them to the butcher.

An important point is to raise enough good feed so that the flow of milk will be the same summer and winter. I think corn is the best and cheapest feed, but it needs other feed mixed with it to produce a good flow of milk. If the corn is taken when a little past the roasting ear stage and cut with a feed cutter in about one inch lengths and tramped down well in a good silo, the fodder is very much improved and almost takes the place of green grass.

The writer has now for two years raised almost as many acres of cow peas as corn and mixed them in the silo and I think it makes good and cheap feed. The corn makes the greatest number of loads to the acre. The cow peas are good feed and likely to be more and more appreciated as we learn the use of them. I always feel sorry when I see stock in poor condition because the owner could not put up enough corn and fodder to keep them in good order. If it is done at the time when it has the most nutriment, it will be eaten with relish and profit by the cattle.

For milk cows use three or four pounds of bran with the silage a day and about half that much of oil meal.

Those who live close to a town or railroad station find sale for a great deal of milk to be used by town and city people for table purposes, etc., and those who live near a creamery can find a good market there, for managers of creameries try to do all in their power to induce farmers in their vicinity to furnish them milk or cream. Many a creamery man has been refused when he should have been encouraged, and the creamery would have been a benefit to the farmers if they had supported it and furnished it with sufficient milk to do a prosperous business. The plan that now prevails is for each farmer to get a good hand separator and run the milk through it as soon as it is milked; then feed the skim milk to his calves and pigs while warm and fresh; then cool the cream as quickly as possible to about 50 degrees, and it may not need to be taken to the creamery oftener than every other day. That is much better than hauling the milk to the creamery, and I look for that to come in general use very soon. The greatest hinderance is the cost of the hand separator and a suitable power to run it. I will not undertake here to tell which hand separator to get nor what power to run it with. You can find that out for yourself if you investigate the matter. Of course there are separators run by hand, but you will soon get tired if you run one of these, and the hired man is a costly power also. Gasoline, steam or horse power wil have to be employed and will be more economical than hand power. And when you have these arrangements, you may as well churn your cream also. You can churn it nearly in the time it takes to take it to the creamery. But if you do that you must learn how to make a good article of butter so that you can sell it at as high a price as the creameries do, and if you are gifted with fair intellect, you can soon learn it. The best way to learn it is to go to the Experiment Station and learn it right.

Some people get frightened before they start into the dairy business because they think too many will enter into it. Now, my friends, there is plenty of room for you if you wish to engage in this business. Missouri needs much more butter than we have ever made and if we get enough for home consumption, it costs very little to ship it to the eastern or foreign market. Besides, if we get laws and regulations so that nothing but butter can be sold for butter, there will be a great increase in its consumption. There are a great many who do not eat butter at hotels and

restaurants because they do not know whether what is set before them is butter or not. I hope that the bill now before the United States Senate will pass, and be so effectual that no imitation butter can pass for the genuine on any table.

NEED OF PURE FOOD LEGISLATION.

G. A. Atwood, Springfield, Mo.

My subject is not one that will please in the sense of being entertaining, but I hope for the cause it represents your present indulgence and future consideration. We take you on no pleasure excursions rich in historic spots or dear to poetry but we desire your company to-day and your enlistment in a cause that means as much for humanity as did some of the wars that cost thousands of lives. The world justly honors the brave men who drew their swords against tyrants. More dangerous than any man or cabal is entrenched fraud, and in the same degree that we love our country and her institutions should we stand for all the rights of the people. It is easier and cheaper to fight an armed enemy in the open, than to run down and send to the penitentiary the wicked, mercenary violators of the law, the betrayers of confidence. The war with Spain lasted but one hundred days and cost but few lives. The contest we enlist in was begun centuries ago and millions of lives have been sacrificed by the assassins just described, and yet, enlightened, progressive Americans, will let the closing year of the nineteenth century pass without enacting a law that 999 of every 1,000 citizens would favor if given an opportunity.

During the campaign just closed it was claimed by orators that there were certain "greatest issues," yet all through the eight weeks when, on platforms and stumps the "spellbinders" were declaiming, each believing, let us hope, in what he said, in not one of the one hundred thousand speeches was so much as a reference made to the most important matter now before the American people. Neither did one of the six parties so much as mention this cause in their platform, though it is a matter of life or death to thousands—is this very question of pure food legislation.

For eighteen years bills have been before Congress, providing for

the protection of pure food and for the punishment of its counterfeiting and adulteration. Pure food congresses have been held and great moral pressure brought to bear upon representatives and senators, not all in vain, but not enough. The baking-powder kings, the oleo magnates, the glucose makers and sugar mixers, and other adulterated potentates who make millions by tampering with food supplies, have been able to prevent the enactment of a national law. Health, happiness, morality and stalwartness mentally and physically depend upon the disposition of this question. The food that people eat determines very much their character and ability.

Various attempts have been made to define man: some one said a man is an animal that talks; so does the parrot. Another said a man is an animal that laughs; so does the hyena. One said a man is an animal that cooks its food; he forgot about the monkey that used the cat's paw to pull the chestnuts out of the fire. Congressman Brosius, author of the pure food bill now before Congress, concludes that man is the only animal that adulterates, and sometimes poisons its own food and drink.

Americans produce more than any other people and they consume more food. Our national food bill costs $5,000,000,000 annually. One hundred million dollars of this money is paid for cheap stuff that has been mixed with the food and drink, and ten million dollars worth is actual poison. Which is the worse man, he who kills one with a dose of poison or he who for the sake of adding to his profits, mixes poison in food products that slowly undermines health, that kills finally, thousands? In the one case the guilty man is hung, in the latter, the great manufacturer, honor is awarded; he endows an institution, may be, and is known as as a philanthropist. We have the statement of Dr. Lattimore, analyst of the New York State Board of Health, that 255 of the 376 articles of diet used by an American family, are more or less adulterated. Drinks and drugs have been tampered with to a greater degree than food, as we shall see.

In justice to the present age, we should add that adulteration of food is not a new thing, but the food products are many times more numerous now than in the simpler times of our fathers when most of the foods were prepared as well as grown on the farm, when people lived closer to nature. Adulteration was practiced 2,000 years ago in Greece. Pliny speaks of the adulteration of wine in Italy. England, 800 years

ago found it necessary to legislate against the cutting down of the size of the loaf of bread and its adulteration. In France 700 years ago there was pure food legislation and the punishment of those found guilty of tampering with food and drink was severe. Germany, in the fourteenth century, punished the adulterators of wine, and it is reported that one guilty man was forced to drink six quarts of the stuff he had compounded for his customers. In England, 400 years ago, the ale was so "doctored" that "ale tasters" were appointed. Macaulay does not record how long these officials lived after taking office! This was before the microscopist and the chemist were employed, who can easily and truly analyze any compound.

Laws have been passed in England, France and Germany during the last 40 years for the protection of the people. The fact that in one year English officials examined 40,000 samples of food and that 5,000 guilty men were punished, shows that Americans are not the only people who are tampering with the health and life of citizens. But these countries now have pure food laws, and we are without such protection.

In Missouri we have food adulteration. Prof. Schweitzer, of the State Agricultural College, recently reported that nearly every one of the twenty-eight samples of canned goods he analyzed, were adulterated. Some of the flour, breakfast foods, wine, cider and other articles of food and drink are not strictly true to name. We have in Missouri, mines of white earth—"tiff" it is called, and carloads of it are shipped to the large cities and there mixed in flour, sugar, salt and etc., and it is largely used in candy, and I was recently told that this "tiff" had been added to woolen blankets to give them more weight!

Here in this Ozark region, in a productive country from which we obtain most of our supplies, we can little appreciate the awful effects of food adulteration. Leave for a moment your homes of plenty and visit the poor quarters of any large city. Note the pinched faces and hollow cheeks of children and of the poor mothers. It is not lack of bread and milk, altogether, that causes all this; it is the adulterations in the bread and milk. Thousands of infants are annually carried away by using adulterated milk, because of the greed of dairymen who add water, and often a "preventive" warranted to keep milk sweet for forty-eight hours! All dairymen do not do this; oh no, but many do.

Drugs are adulterated in as great a per cent as are food products.

A prominent Springfield physician said to me the other day, while we were speaking on this subject, that he had said that were it not for the fact that there was one firm in Cincinnati that put up reliable medicines, he would retire from practice on account of the extensive adulteration in drugs.

The Food and Dairy Commission of Ohio collected and analyzed 1,471 samples of food and drugs, and 919 of these were adulterated, 63 per cent. Salicylic acid and other antiseptics, highly injurious, were used, and coal tar dyes in coloring. The commission also reports that all but three in ninety-six samples of catsup, from different factories, were adulterated. Of fifteen samples of coffee only two were pure. The adulterants used mere coffee screenings, peas, chickory, rye, bread, corn, etc., and in some instances not a particle of coffee was found in the sample. Buckwheat cakes are now in demand. Of eleven packages examined only two were pure; in one case 33 per cent was corn meal. Please remember that these reports were made by expert scientific men. Of twenty-eight samples of cheese nineteen were adulterated; in one case 87 per cent of the fat was lard; cotton-seed oil was also used. Many enjoy a cup of cocoa; of thirteen samples analyzed by the Ohio commission, ten were adulterated. Eleven samples of cloves were analyzed; three were pure. Roasted bread, ground bark, shells and capsicum were found. From the whole cloves, in some cases, the oil had been extracted. Here is an article that should be produced in this Ozark country, by thousands of barrels—fruit jam. It is largely manufactured in Ohio and sold as a pure fruit production. Examination proved that all samples but one were artificially colored, and that all were adulterated. Salicylic acid was found in every specimen.

The Agricultural Experiment Station of Connecticut for several years has conducted investigations in food supplies. Purchases were made at a number of stores in the state with the purpose of getting at the general average of the adulterations; these were analyzed at the station. The official report is certainly an argument in favor of pure food legislation.

Ladies will please notice this about lemon extracts; thirteen samples were tested and only one was pure. We beg to suggest that it would be safer, as well as cheaper, to buy a real lemon. All samples of strawberry extracts were adulterated, and in most cases no strawberry was discovered. Of seventy-four samples of wine tested 11 only were pure. Of ninety-

four samples of whiskey, 29 were pure. We have no statistics on tobacco adulterations, but it is well known that it is largely tampered with. Lovers of the weed in its purity should join in the demand for a law against adulteration, or, better, give up smoking and chewing and apply the tobacco to their trees.

Enormous quantities of baking powder are used and tons of alum are swallowed to the great injury of health. Senator Mason, chairman of the committee appointed by the United States Senate to investigate food adulteration, says: "When we made this report we made it based on the evidence before us and the evidence is simply overwhelming. I do not care how big a lobby there may be here for the alum baking powder, how many memorials they publish, there is no place in the economy of human food for this thing called alum. The overwhelming evidence of the leading physicians and scientists of this country is that it is absolutely unfit to go into human food, and that, in many cases—if the gentlemen will read the evidence—some of the physicians say they can trace cases in their own practice of diseases of the kidneys due to the perpetual use of alum in their daily bread. I want to give the Senate an idea of the class of men we have called. They are the leading scientists from every college of the United States that we could get hold of. We had open doors, and no witness ever came before that committee in the twelve months we were hearing the evidence, but were permitted to testify."

We have seen "preservatives" advertised for sale. "Preservaline" is one of these. A little of it added to milk will keep it sweet for forty-eight hours! "Iceline" is another. Sprinkle a little of it on sausage or any other meat or butter, and the article will "keep" for days. No statement has appeared as to how long the people who eat such products "will keep" their places among the world's workers.

Salicylic acid is one of the most common preservatives. Borax is also used. Cochineal and coal tar dyes are much employed "to give color" to liquid food and drink. "Tarred rope and such stuff are ground up and mixed with ground goods. Some of the common breakfast foods are not pure. Many of the brands of tea and coffee are colored, and it is a well known fact that some of the tea on sale has been used in the big hotels of the country; it has been gathered up, dried, "retouched" and sent abroad again to give cheer to tired women! Pardon us for this recital of outrages. We would not harass your sensibilities! Yet the

half has not been told. It is not our purpose to exaggerate the evils of food adulteration. We do not wish to create a panic nor to arouse fear. Of all things, do not think you are eating poisoned articles. If you mix fear with a really pure food, with the thought that it may be adulterated, it will be as bad as to eat the adulterated compound in the belief that it is pure.

We must speak of oleomargarine. During the year ending June 30, 1900, there was manufactured in the United States 104,263,023 pounds of oleo, an increase of 24,000,000 pounds over the product of the preceding year. The illegal sale of oleo in Ohio alone last year, amounted to 8,330,969 pounds. In New York, with double the population and with the second metropolis of the world, the illegal sale amounted to only 222,788 pounds. These states have similar laws controlling the sale of oleo. In one state the law is enforced, in the other it is not. Hon. H. C. Adams of Wisconsin says: "Of the eighty-two million pounds of oleo made in 1899, seventy-five million pounds were eaten by people who called for and paid for butter."

The oleo manufacturers claim that the poor man wants oleo. This is a mistake. They buy it supposing it to be butter. The men who make such assertions are paid $3,000 to $4,000 dollars per year to stay in Washington and do this kind of work and help defeat pure food legislation. The dairymen claim that oleo should be marked oleo, and that it should be sold as oleo—that it should not be colored in imitation of butter. Congress has also been asked to tax butterine, colored in imitation of butter, ten cents per pound, because it is counterfeit butter, and is sold as butter at a butter price, to the injury of dairymen who have hundreds of millions invested in business. Pure butter can not be made for less than twenty cents per pound; butterine, or oleo, can be made for seven cents per pound. As the latter is sold at twenty-two cents, you see manufacturers can afford to spend thousands of dollars to defeat pure food bills. It might be well to state here that oleo makers claim that a law taxing oleomargarine would be "class legislation," and consequently, unconstitutional. Chief Justice Marshall, whose ability and high character will forever honor our Supreme Bench, decided that Congress had a right to destroy a business which is prejudicial to the public good, by taxing it out of existence. Bear in mind: the advocates of pure food legislation are not asking for a law that will prohibit the manufacture of

oleomargarine. They only ask that the product shall be honestly labeled, honestly sold, that consumers shall be protected from deception and fraud. If one prefers oleo to butter he should have it. Is not this right? I think we feel alike on this matter. I certainly indulge sparingly of the little yellow squares placed before me when I happen to be at a St. Louis or Chicago hotel, for I mistrust that it is not the kind of butter that is made of the good old fashioned cream, but a compound prepared in a slaughter house.

My regard for the faithful cow, admiration for the dairy maid and loyalty to the proud mother who makes the yellow prints after patient churning, impels me to leave Armour's make untasted!

We have referred to Ohio and Connecticut. Pennsylvania has a law against the sale of bogus butter, but we read in the North American the other day, that "last Monday fifteen tons of oleo, colored to imitate butter arrived at the freight depot and were carted away to be retailed as pure butter." We must not only have just laws, but honest men to enforce them.

Let us present an illustration to show the injury adulteration works: In 1880, twenty years ago, the United States exported to Great Britain, 128,000,000 pounds of cheese. In 1898, our exports had fallen to 46,000,000 pounds. Our cheese manufacturers, some of them, began to make filled cheese. Our cheese exports fell away, as we have seen, and in spite of the strenuous efforts of our Secretaries of Agriculture, it is now but a third as large as twenty years ago. Canada, on the other hand, has had stringent dairy laws and her exports in cheese have increased from 40,000,000 pounds, in 1880, to 150,000,000 pounds, in 1898. It is easier to tear down character and reputation than to rebuild.

Germany, France, Great Britian and other countries have laws shutting out adulterated products. This is right! Governments are instituted specially for the protection of citizens.

We must speak of adulteration in fruit products: Every citizen of the Ozark country has a personal interest in the protection of her fruit growers. With pure food laws, State and National, our section of the Union would soon become prosperous, beautiful, noted for its orchards, berry fields and vineyards, famed for its attractive homes. We have a natural fruit country. What is the situation? We have stated that an official analysis in Ohio has shown that the strawberry extract sold, con-

tained no berry juice, that fruit jams and jellies are adulterated—that wine is not pure. I know I do not exaggerate in asserting that 100 carload of strawberries in this section were allowed to rot on the vines in 1899, that would have been sold at a good profit had there been laws against the sale of the counterfeit products. In some cellar in a city "the fruit juices," so called, are compounded, with not a bit of fruit, but colored to represent any fruit, and the fruit grower, who can not compete with the manufacturers who use lake water and chemicals, loses the profit he is entitled to. Most of the vinegar sold never reposed in apples; it is made of water and acids. Recently I had a call from a friend who has twenty-five thousand gallons of pure cider vinegar; he is anxious to sell it—he needs the money it has cost, and would accept an offer of five cents per gallon. If counterfeit vinegar was not everywhere sold, which costs less than four cents per gallon, or even if it was sold for what it really is, our fruit growers, who are endeavoring to convert this region of blackjacks into a land of orchards, would realize something from their costly struggle in a noble industry. Competition and rapid transportation, make it necessary that the fruit grower should realize something from every portion of his crop.

We have been sending steam engines and iron bridges to Europe, Asia and Africa. If we ship a few of these made of poor material we shall quickly lose our trade, as did our dairymen. This applies to fruit, to meat, to flour and to everything we sell. We are a world power, first in agriculture, first in manufactures, first in war, and strongest for peace. If we are to continue first as a moral power, we must be honest and stalwart for what is right. We must not permit cheating or poisoning at home or be responsible for it abroad.

There should be food inspectors in this country. Every manufactured food product should be labeled honestly. If meal is mixed with flour it should be sold as a composite article. All counterfeiting should be punished. A few cases of detection, followed by conviction and fine, or imprisonment, or both, would soon secure general observance of the law and we should have a healthier, manlier nation. We have laws against counterfeiting money and the penalties are very severe. Is it not more important that the food that people take into their systems should be genuine than that the money we put into our pockets should be genuine?

We repeat, we are a world power—the greatest on the globe. We have the most liberal constitution and laws, the most freedom, and we *think* that we shall endure forever. So I think, but we know, too, that in years so distant that the marble palaces of unknown kings have been buried under the accumulation of dust of ages, that the citizens of the nations ruled by those dead monarchs, and later, the citizens of Greece, of Rome, and still nearer, the citizens of Spain, which at one time ruled over more territory than any other government that ever existed, except it be Great Britain—all these believed that their governments would stand until the end of time—even as we now believe of our grand Union. But if we permit wrongs to remain unrighted, if we fail to protect citizens, if we neglect to make just laws and to enforce them, or become overbearing from pride of power, or enervated from indulgences in living and from habits of idleness, we shall experience the fate of the Romans and of those other peoples when they forsook the strenuous life of the builders for one of ease and luxury and of neglect of civic obligations.

This may seem like a "far-fetched" illustration, but it is not. If we, in our greatness neglect to legislate for the masses, if we fail to protect them from fraud which not only robs them of money but undermines health and manly honest traits, then this grand country of ours will have to pay in full measure by some fearful sacrifice for its inaction. The remedy is in our hands. See that your State Legislator and your member of Congress vote for pure food laws, and I hope that to-day this honored and influential society will resolve in favor of *pure food legislation.*

---

*ORGANIZED WEALTH A MENACE.

By Dr. R. H. Jesse, President of the State University.

The tendency in modern times towards socialism, communism and even anarchy, seems to terrify many people. No one will deny that there is such a tendency. No one will question that it threatens our institutions. But to my mind this danger is small compared with that

*Published originally in the St. Louis Journal of Agriculture.

which threatens from accumulated and organized wealth. Its lack of sympathy with the struggling masses is indeed one chief cause of communism and anarchy. More than half the wealth of our country is controlled by less than a thousand men.

Many plead as an excuse that the road to wealth is open to any man. The road to enormous wealth in a lifetime should be closed to every man. No one can accumulate the prodigious fortunes of our modern plutocrats by honest labor and clean transactions in the space of one lifetime. Few immense fortunes are gathered in a lifetime by methods that will bear inspection. Many of the wealthiest men have heaped up riches in ways that are morally no better sometimes than highway robbery. Manufacturers, in many cases, have risen to princely wealth by grinding down their employees to starvation wages, thus cutting off educational opportunity, and even moral training from thousands of children that are to wield the ballot. Railroad magnates have often grown rich by wrecking roads, depressing stock, and "standing in" with construction companies. Merchants have frequently become "princes" by forcing their competitors to the wall, using for oppression the powers that were given for good. More than one colossal trust has gained wealth and power, largely by conspiracy with railroad officials, whereby special freight rates have been secured that are denied to all competitors.

The man that in any shape or form uses the rules of the commercial exchanges, or the laws of state or nation—rules and laws made for the protection of business—for oppressing his employees, or robbing his neighbors, should be sent to the penitentiary as surely as the man, that at the point of the pistol, holds up the wayfarer.

Meanwhile, society is supported by honest, hard-laboring people, who, guarding the country at home and abroad have furnished protection to these men. By making life and property safe, they have rendered it possible for the plutocrat, holding in safety his gains, to pass them on to his children. It is time that the claims of society were receiving better recognition. Without its protection, property can not be held in security or handed down from father to child.

One of the most encouraging features in modern times has been the growing disposition to challenge the right of any man to transmit large property to others, for personal possession, without paying to society, as guardian and protector, through whose aid alone such a transfer is pos-

sible, a special tax. The idea of the inheritance tax introduced from England into the Eastern States, has been steadily traveling westward. Every year the notion gains ground, that men desiring to hand down wealth to their children, must pay society a tax on that right, in proportion to the amount bequeathed. The day seems to be coming when society will refuse to permit a man under its protection, to will to any person, for private use, more than a certain amount of property. So far as the writer knows, this idea has not yet crossed the Mississippi River, but recently the Supreme Court of the United States has been called to pass upon the constitutionality of an inheritance tax imposed in the State of Illinois. Meanwhile, in the East, the disposition to increase inheritance taxes in proportion to the size of the estate has been growing steadily.

Our American people are probably far from the idea of limiting the amount of money that a man may acquire by clean methods in his lifetime. Personally I am opposed to any such limitation. But if the writer reads the signs of the times correctly, the day is not far distant when society will gravely debate the question of how much money, under the protection, a man may will to others, for personal possession. The Collateral Inheritance Law in this State has already imposed in behalf of education, a tax of five per cent on all callateral inheritances. It has said to the childless man or woman that property may be given freely, without tax, to charity, but that if it be given to private individuals, it must pay to the cause of educaton, a tax of five per cent. It would not seem unjust to extend the same idea to large inheritances bequeathed even to children. Constitutional, or not, the Collateral Inheritance Law represents the sentiment of the people of Missouri.

"Certainly there is a hope and expectation, provoked by the unjust and threatening conditions of the times, that some co-operative enterprise, broad in its scope and wisely planned, shall arise very soon to be the emancipator of industry. This hope and expectation excites keenest public interest in each new attempt to inaugurate a co-operative work. The public is becoming more and more of one opinion that the emancipation of industry will come through industrial co-operation."

Missouri Swine Breeders' Association.

Tuesday, December 11, 10 *a. m.*

Reported by Miss Snowdon Willis.

House called to order by President J. C. Canaday.

ADDRESS OF WELCOME TO THE INDUSTRIAL ASSOCIATIONS.

By A. W. Walker, Fayette, Mo.

Mr. Chairman, Ladies and Gentlemen:

On behalf of the good citizens of Fayette and of Howard county, I rise to welcome you in your industrial conventions. I welcome you because you bear the name Industrial. I have read somewhere that there is nobility in labor and somewhere that in the sweat of man's face he should eat his bread. I take it that industry and industrial mean more than mere names.

I welcome you because you come under the auspices of the State Board of Agriculture. Because your habitations are close to Nature's heart; and I congratulate you that you come not from factory walls and tenements befogged with smoke but that you have chosen a wiser part and builded your homes on nature's great, green sward, where the very air invigorates and the multitudinous voices of nature tell you that your pursuits are noble. I welcome you because you exalt the station of the Missouri farmers, that high type of American citizenship.

I welcome you because you are representatives of the great State of Missouri, a commonwealth which furnishes no excuse for tramps or idlers; a State which is in itself an agricultural Eden; a State, which produces cotton as well as corn, which produces fruits in luxuriance,

Note.—A full report of the meeting was published in pamphlet form.

whose horses and cattle and swine and sheep and poultry are unsurpassed in the great Mississippi Valley and a State, which by dint of perseverance and Missouri pluck, expects in the next few years to have good roads ramifying through its territory from the Mississippi river on the east to the arid plains of Kansas on the west.

I welcome you, ladies and gentlemen, because you have organized and are organizing. In unity there is strength and in organization there is power. In the competitions of business and of commerce organization must needs meet organization. If Missouri expects to advance or to maintain her position among the great states of the Mississippi Valley, she must do so by thorough, intelligent and practical organization along all industrial lines.

Furthermore, the banks and the money power of the country are organized; the manufacturing interests are organized; the transportation companies are organized; the laboring classes are organized; and it behooves the agricultural classes to organize and in the antagonisms of trade to meet bayonet with bayonet and sword with sword.

I welcome you, to-day, ladies and gentlemen, because I believe that during the political and social and economical convulsions which disturb our nation, the only impregnable fortress of our American liberty is the home of the American farmer. He stands as a mediator between the oppressions of capital on the one hand and the excesses of labor on the other. He is a rebuke to socialism on the one hand and an enemy to aristocracy on the other. He stands at all times unmoved and immovable as the champion of our freedom and altogether the noblest type of our citizenship.

For these reasons, ladies and gentlemen, I welcome you this morning to the historic old county of Howard, the "Mother of Counties," distinguished by famous sons; a county where blue grass is a part of nature, where magnificent herds of Herefords and Shorthorns and Polled Angus have their haunts; a county where the girls grow beautiful and the young men grow brave.

I welcome you to the good city of Fayette, a city of schools and colleges, a city of hospitable people. In the name of the mayor and councilmen and good citizens of our city and of the good citizens of our county I say unto you: The latch string hangs out; pull, and walk in. Help yourselves to whatever is in sight and if you desire anything further, knock and it shall be opened unto you.

RESPONSE.

By CHAS. OPEL, Jefferson City, Mo., for Poultry Association.

Mr. President, Ladies and Gentlemen of the Industrial Associations of Missouri, the Honorable Mayor and Fellow Citizens of Fayette:

As a rule it is not considered good taste to preface an address with an apology, but we are aware that there are exceptions to rules which it is wise at times to follow, and I am persuaded that this is one of the times.

My reason for offering an apology to you at this time is that while the printed programme places me for an address before people of my own feather, I am suddenly, peremptorily and without recourse commanded to appear before this honorable body of representative and progressive fine stock breeders and fanciers of Missouri, to respond to an address of welcome by the honorable mayor of this city.

I assure you, ladies and gentlemen that it is no fault of mine that I appear in what may appear to you to be a presumptuous attitude, for it is far from me to presume to speak for you along the lines of the business in which you are all experts and past masters, nor would I even attempt to respond to the address of welcome first delivered to you, were it required of me to speak officially for you, for that would be impossible.

There is a trite saying "Faint heart never won fair lady," which being interpreted into chicken parlance would read, "Nor căn a chicken hearted man stand before a Missouri audience."

So then in the endeavor to respond to the welcome given us by this hospitable little city of Fayette, I will at least with assumed boldness, enter into a field of thought common to us all. A field in which we all feel at home, a field in the which grows the best and sweetest of all human products, and that is friendship.

In the cultivation of that field however, as in all things we engage in, some are better adapted than others, to bring about the best results, but we all wish to share in its fruits, we all enjoy its happy expanse, and all are therefore interested in its harvest.

One of the most pleasant things in this life, if indeed it may not be

called the most pleasant thing, is to know and to feel that you are welcome in the hearts and the homes of your fellow citizens.

A man's home is indeed his castle whose confines none may enter, with impunity, save a friend, whose coming breaks asunder no bars, but adds yet another golden cord to the holy bond which binds man into one grand brotherhood.

The good will expressed in the welcome extended to each other there, has brightened and sweetened many a weary day, and has made us fellow citizens in deed and in truth.

The welcome to the stranger within the gates, as well as to the neighbors at our door, tends to reveal to us the true brotherhood of man, which leads up to, and culminates in the realization and understanding of the fatherhood of God.

This bond of sympathy among men impels us to form such happy associations as these, in the which we extend to each other the hand of good fellowship and love, demonstrating the happiness which flows from obedience to the second great commandment, "Thou shalt love thy neighbor as thyself." The measure of our love to God is manifested in and by our love to our neighbor. There is no other standard given among men, nor can any other be devised.

So we express our hearty appreciation of the welcome extended to us by the citizens of Fayette, the queen of Howard county, and we gratefully receive their many kind and hospitable attentions. We are not unmindful of the fact that the preparation for our coming, and the cost of our reception here has been of no small consequence to this city, nor do we fail to appreciate your anxiety that all shall be well done, and that all shall be pleased with their visit to your city, of which you are justly proud. The declaration that it is "more blessed to give than to receive" is not lost in our experiences for to know a duty well done, an unselfish sacrifice made, brings to us our sweetest reward, for "the problem of life is service."

Nor is the visit of the State Industrial Associations to your city of little consequence within itself, for its deliberations and associations will leave an imprint of lasting benefit to all, and I trust that the recollections of our visit here will be mutually pleasant. So then let us revel in the fragrance of our God given and rightful inheritance of "Peace on earth and good will to men."

The meetings from time to time of these State Industrial Associations have been of great and lasting benefit to the entire State, manifested in the marked progress, we may rightfully say marvellous progress made in the breeding of a higher and still higher class of stock and poultry which has placed grand old Missouri at the head of the procession of states.

In the production of fine and commercial poultry she easily leads all the states and in the production of fine and blooded stock she is the proud competitor of the world.

Howard county, whose hospitality we now enjoy, is noted for her fine stock, her fine poultry, her happy homes and fertile soil, but strange as it may seem, she is noted most of all for her mulishness. A mulishness however which brings with it blue ribbons and fat premiums and is therefore much sought after.

It may be of interest to know that within her borders are bred some of the finest standard bred poultry in the world.

So my fellow associates of the Industrial Associations of Missouri, take off your hats, for you are in the happy land of good things second to none in this great State, and superior to anything outside of her borders.

Let us therefore rejoice in the knowledge of the fact that we are welcome here and elsewhere, that we are, in our annual meetings and deliberations of these associations, doing a good work which brings its own reward; let us rejoice my brethren that we can blow our own horn, and that we can by our own imaginations at least place ourselves upon the highest pinnacles of fame and renown, and from our lofty perch, look down upon a world, the center and circumference of which is Fayette and her people, and their honored guests, the State Industrial Associations of grand old Missouri.

RESPONSE.

By C. O. RAINE, Monticello, Mo., for State Grange.

Mr. Chairman, Ladies and Gentlemen:

It certainly gives me great pleasure to have the privilege of being before you this morning in response to the hearty words of welcome that have been given us. I was very favorably impressed with the words of welcome we received here this morning.

When I arrived in your city on Sunday afternoon, I found that there was but one hotel, and that could accommodate a very few people and I wondered why it was that the Industrial Associations had been invited to the city of Fayette. But upon further investigation, as was fully shown by the introductory remarks this morning, I found that they had no need of a large hotel, that this is one grand city of hotels, that the people open wide their doors and that every house in the city of Fayette is a hotel. It is a city of schools and it is not necessary that a hotel accommodate these people, but every preparation has been made for their comfort.

If we had supposed that the address of welcome this morning was to be delivered by some official of this town, we would have said at once that the gentleman who delivered the address was a member of the Grange and if he is not, he certainly has that mark upon him because he certainly advocates the principles we teach—organization in its true, liberal sense: and instead of having the inscription upon the walls we see here—"No admittance inside this bar"—which we suppose was placed here by a certain organization because that organization saw the necessity for it, we would have the inscription *"Welcome to the Grange,"* for we teach if the grange stands for one thing above another, it is the necessity for co-operation of agricultural interests in all laudible undertakings. We ask none to join us who can not see good in their fellowmen, but to all interested in agriculture, who have open hands and generous hearts to help the needy, we bid a hearty welcome.

We come for the second time in co-operation with this Association. We are glad to meet you here in this annual session and while we appreciate the courtesy that has been extended to us by these people, we

believe that it has been from the heart and that the people of Fayette have not made this talk for nothing.

Permit me to say that on to-morrow afternoon will be held the public meeting of the Grange. We ask the attendance of all who can be with us on that occasion. The exercises will be held in this room. We expect to have with us the Master of the National Grange. He and several other prominent speakers are expected and we invite one and all to be present. Ours being a secret organization, it is not the province of each individual to appear before that body with any work that he might wish to present, at any and all times. But while we are here for the purpose of benefiting and being benefited, as Master of the Missouri State Grange, I invite you, if you have anything for consideration for the betterment of mankind, for the building up of industrial education in this State—any matter pertaining to our interests, to make it known and we will give you a hearing before our body.

Now in behalf of the State Grange, we accept your cordial invitation and shall carry home with us the words of welcome and warm reception we have received from the good people of Fayette.

RESPONSE.

By G. W. WATERS, Canton, Mo., for Good Roads Association.

Mr. Chairman:

I believe there is one blessed man in this response business. The Scripture—I think you will find it if you look long enough—says. "Blessed is the man who has nothing to say, provided he can keep from saying it." Therefore there shall be one response that shall have this blessing, a blessing from this audience.

One utterance made in the beginning of the Address of Welcome given by Mr. Walker, was especially impressive, that on industry. It recalled to my mind a statement made by that old Englishman, John Ruskin, who uttered this truth, that: "Life without industry is sin. Industry without art is brutality." Turn that over in your mind just a moment and it will appear to you why we met in these industrial capacities. Labor without life, labor without mentality is but a brute force,

and in the direct ratio of the amount of mentality used in the performance of our work, come results in success and in happiness.

But I am here to respond on behalf of the Good Roads Association, and I want to say to you that Missouri the last four or five years has made a good deal of history. I grant you that it does not appear in large and glowing letters—is not emblazoned on the statutes: but I do believe and will predict that some of you will live to see the day—and that soon, when the forces and the sentiments that are now silently at work will bring forth and are bringing forth a road system equal if not superior to that of any other State in the Union, a need which is very apparent. I grant you that there is truth too in the statement that the darkest hour is just before the day, and that the darkest hour in the Road Improvement Association business is just in the recent past. But I do say, and I say it, I think, advisedly, unless some backward step is taken, the darkest hour is just past and there is the day dawn coming.

Now this is a matter that we would like to have time to elaborate more fully and will endeavor to develop at our regular association meeting, which unfortunately, I am going to say is the last on the program.

I am going to say one thing in reference to this matter; unless some steps backward are taken in reference to this movement that is being made, we to-day are standing on the threshold of a new era in road progress in the State of Missouri, however dark the prospects may have seemed to you in the near past.

But it will not be proper for me to discuss this question at this moment. I am here only to announce these things and to say to the speaker who has given us this welcome that it was the welcome we expected—it was not in this case "the unexpected that happened." We have known these grand people of Fayette these many years and we have known of their hospitality in the past; we have tested their hospitality in the recent past and we are glad to know that this hospitality still lives in this grand old section of country, and we are prone to believe that this hospitality and this grand and noble manhood and womanhood that has been perpetuated here will continue on and on. We, therefore, feel glad to meet in just such a community as we are now in, and we hope that these associations, these meetings together, these exchanges of thought shall give an impetus to every industry that is represented here. I thank you for your attention.

PRESIDENT'S ADDRESS.

By J. C. CANADAY, Bogard, Mo.

Ladies and Gentlemen:

I have the honor of filling this place, but not being able to make a speech that amounts to anything, I feel my inability to fill this position.

We have met here for a noble purpose this morning, to try to teach each other and learn from each other. I have thought some of speaking a little of the earlier days, as I have already reached a considerable age, being sixty-two years old. I can remember back when our swine, in which we are especially interested, were rather of a poorer quality. The cause of the difference is a continual selection of the best. That is what we are met for, to try to learn how to select the best and to feed for the best results.

Many of us do not think of the past. We are all the time thinking of the present and it appears to us as though we have already reached as great a height as we can ever hope to attain. Just think back, of the hogs we used to feed when we were boys—we older men. Then it would take from fifteen months to two years for a hog to weigh two hundred pounds. Now a pig nine months old can easily be made to weigh two hundred pounds. See what an increase has been made by the continual selection of the best.

See what progress has been made in agricultural literature . Our tables are now groaning with papers, containing pictures of fine stock and articles on how to raise them. We have a great advantage over our fathers of the early day, and are on the eve of greater things than we have yet seen. The young men of to-day in forty or fifty years will see greater progress in swine compared with those of to-day.

Thirty years ago when I came to Carroll county I found it mostly country hill-side. I wish to mention a hog-killing time we had then. One of my neighbors asked me to come and help him kill hogs. I had come from the east and found the woods of Carroll county very different from my former home. Well, this man invited me to help him kill hogs. He had a pen of eight or a dozen little shoats, all of which would not now

make one good stock hog. He found one or two that he thought might possibly pull through the winter and let them go. We killed those he thought could not possibly pull through the winter. I remember my neighbor went into the pen with his chopping ax, chased around after a hog and hit it in the head: it flounced around and the hind part went through a crack in the fence, and it would have gotten out if its head had not been so big. Our hogs could get the head out the first thing now. That shows what a great improvement we have made. What will be the progress in another forty of fifty years.

I think we can take courage and try still harder to improve our fine stock, our hogs, poultry, cattle, horses and sheep, and do not forget or leave out the Belgian hare.

We have met together for several years and there has been no word of jealousy between breeders. They might get further back and say something, but we have never heard a word of jealousy.

I would like to say one thing more. It seems a strange thing to me that this house is able to hold the audience—not that I am such a great speaker—but the industries that we are working for should be of interest to every farmer in the United States, and especially in Missouri and it seems to me that *many* should be here. I believe it is a good place for a man to learn something, we should all get together and try to learn from one another.

Mr. Schooler—It appears to me that most of our people on the program for the Swine Breeders' meeting have not yet arrived. There are but few here and I think that more than likely several more will be here this afternoon. It might be well for us to delay our program until afternoon.

Mr. Lail—Our program is not long and we can possibly get through it this afternoon and give others an opportunity to come in. I think Mr. Schooler's suggestion a good one.

PREVENTION AND EXTIRPATION OF HOG CHOLERA.

By Dr. D. F. Luckey, State Veterinarian, Columbia, Mo.

When we speak of the prevention of hog cholera there naturally comes to mind the thousand and one ways in which we attempt to accomplish the desired end. The drugs that have been in common use for this purpose are too numerous to mention. It is sufficient to say that almost all the known medicines have been tried both to prevent and to cure hog cholera and the results have been very discouraging. The fact that charcoal or salt and ashes was fed to hogs and they did not have cholera is no proof that these things are preventives. Very little merit can be attributed to any drug or patent remedy, either for the prevention or cure of hog cholera. Any antiseptic, it is true, will destroy the germs of the disease and if all the air that the hog breathes and all the food that he eats and all the water that he drinks could be saturated with some antiseptic the disease could be prevented. This, however, is impossible. The feed may be disinfected and yet he may get the infection through the water, or *vice versa.*

The proper way to control hog cholera is to first understand the main points in connection with the disease and then use good judgment in accordance therewith in handling a bunch of sick hogs and disposing of the carcasses of those that die.

Let us stop here to note that hogs have other fatal diseases than cholera. It is important to be able to know them.

I was sent in 1896 to Greenfield, Missouri, to investigate an alleged outbreak of hog cholera. On examination of two herds of hogs I found there was no known source of infection with cholera, also that the hogs were not dying fast enough to indicate cholera. The symptoms; emaciation, restlessness, loss of appetite, the eyes filled with a sticky mucous secretion and excessive diarrhea which at one time would end in the death of the animal, but at another, in return to an improved condition. I killed and carefully dissected some of the worst cases in each bunch. There were no inflamed areas in the lungs indicating swine

plague and no characteristic cholera ulcers in the intestines but the duodenum contained a large number of long round worms. I advised the santonin treatment for the worms and in the farmers' institute at Greenfield last October, Mr. Russell said, "We gave them the treatment you recommended and they got all right."

If I had found the lungs of these hogs patched over with inflamed and congested areas—which any one can easily recognize—the disease should have been called swine plague. If I had found the hogs dying in large numbers and on post mortem examination that the walls of the intestines contained the characteristic ulcers the disease should have been called hog cholera.

This experience is related mainly to show the necessity of being careful about the diagnosis of a disease which is playing havoc with a bunch of hogs. It is important to know exactly whether the disease in question is really hog cholera. The best way to make a positive diagnosis is to kill one or more of the affected hogs and by a close examination of the carcasses locate the lesions of the disease and discover their exact nature.

When we have decided that a bunch of hogs has cholera, the disease in question here,—and the same may apply to swine plague—we must next take into consideration that the entire organism of the sick hog swarms with the specific germ of the disease. The whole carcass of the hog which dies of cholera is permeated with millions and millions of these germs. The germs are not only present in the carcass but under the climatic conditions which exist in this latitude about six months of each year they propagate freely in the soil and especially in sluggish streams. It has been observed that hogs along the entire length of ordinary creeks die of cholera, getting the infection from the water. The path along which the carcass is dragged swarms with the germs. The ground over which a sick hog walks is contaminated with them. While they are invisible to the naked eye they are positively there and in abundance. We must know that wherever these germs exist they may be carried from there to other places in very many different ways. They are conveyed from place to place, as has been said, by running streams. They may also be carried on one's feet or on the feet of stock or even of birds. A small piece of a carcass containing millions of the deadly germs is often carried about by dogs or by birds as carrion.

Bear in mind too that in order to have an outbreak of cholera among your hogs they must be infected with the germ of this particular disease. Hog cholera does not develop spontaneously nor is it due to good or bad or any particular kind of feed as it is sometimes claimed or acorns or green corn.

The farmer knows that to get a crop of corn on his field that grains of corn must first be planted there. The bacteriologist knows equally as well that in order to have hog cholera the germs of cholera must first be introduced into the system of the hog. One difference being that the farmer must cultivate his corn while the bacteriologist is spared that trouble in producing cholera.

These facts are no doubt already well known to the majority of the swine breeders here to-day, but in view of their importance they will bear repetition.

Knowing them we are well armed in our defense against hog cholera. We will know better than to depend on feeding drugs and patent medicine preventives and at the same time to stand idly by and allow, what any thoughtful man can readily see is a source of infection, go on without interruption. We will know better than to tramp around among a neighbor's sick hogs and return among our own without first disinfecting our feet. We will know better than to keep a dog which runs about over the country looking for cholera meat to bring home as infection to our healthy hogs. What we want to do is to think about these dangerous things and not do them. During the time our neighbor has hog cholera we will know to stay at home; to keep our dogs and hogs at home; to ask, if necessary, our neighbor to stay at home and to insist especially on his keeping his hogs at home. In fact during the disease to shut off altogether that genuine article so manifest here to-day—Missouri hospitality.

But under present conditions despite the greatest amount of vigilance there will occasionally be an outbreak of cholera among the hogs. As records fail to show any cure for hog cholera, I want to advise very strongly against wasting money on the purchase of drugs for that purpose, especially to the neglect of the proper disposition of the carcasses of those that die.

At present the veterinarians hold that hog cholera is incurable. Then do not cling to the false hope of obtaining any good from drugs

and patent medicines. Bow to the inevitable, accept your fate, keep your money in your pocket and look further ahead. Look to the protection of your neighbors from infection and to the eradication of the disease from your premises. Drop the idea of curing your sick hogs and use your time and energy in doing your part in properly disposing of the dead ones. The man with choleried hogs has a sacred duty to perform in keeping the disease away from his neighbors. There is but one way to do it. That is to burn the carcass of every hog that dies and as near as possible in the place where it dies. If that is done the source of infection is removed. It will then be impossible for the streams to become contaminated with the germs of hog cholera. It will be impossible for dogs and birds to carry the disease from place to place. It *will* be *possible* if every man does his duty in this respect to eradicate this miserable disease from the entire state of Missouri.

The statutes require that hog cholera carcasses be burned or buried and while I hope that no coercion will ever be necessary to get Missouri farmers to do their manifest duty I say that if any individual is obstinately careless in the matter the law should be invoked.

In as much as the carcasses of cholera hogs have been buried as long as two years then accidently exhumed with the result of a prompt outbreak of cholera, it is evidently not a good plan to bury them if it can be avoided. Burying only preserves the germs almost indefinitely. If the carcass is ever exhumed it is a renewed source of infection. Even if it is not exhumed it is possible for the earthworm to carry the germs to the surface of the ground.

The extirpation of hog cholera depends upon burning the carcasses of the hogs that die, promptly, and as near as possible to the place where they die. It would, indeed, be economy to kill all hogs that are seen to be affected and add their carcasses to the heap. The burning of the carcasses need only to be sufficient to destroy the germs. After a reasonable amount of cooking the carcass makes first rate food for all kind of poultry and for other hogs but whatever you do don't serve them up too rare.

To be or not to be rid of hog cholera in the whole State depends on whether or not the carcasses are all burned.

DISCUSSION.

Dr. Luckey—I did not expect to be alone on the program to-night or I would have written a much longer paper. I know a good many things about hog cholera that I should like to have mentioned. It would give me great pleasure to answer any question asked by any of the members of the association.

Mr. Sydnor—What treatment did you say you gave those hogs for worms?

Dr. Luckey—Santonin. I gave a shoat weighing one hundred and fifty pounds, fifteen grains, over half a teaspoonful. Different powders weigh different amounts, as they have a different specific gravity and it is better to have them actually weighed. The important point is this, if you have a disease among your hogs, kill one of your hogs and find in the intestines the worms that trouble it. If you intend to give your hogs treatment, it must be done quickly and it is necessary to put the hogs you desire to treat where you can starve them for twelve hours before giving them medicine. This is important. Then give them a dose of santonin, sometimes as high as twenty grains and follow that in a few hours with salts or calomel.

Mr. Canaday—Would it not be a good idea to try some disinfectant?

Dr. Luckey—There is not much in a disinfectant to waste your time on. It is always desirable to keep lime thrown around the hog pen, but a disinfectant can not prevent hog cholera. A well hog can touch an infected hog on the nose and contract the cholera regardless of disinfectants on the ground.

Mr. Sydnor—Why is it some hogs will not take the cholera when they come in contact with it?

Dr. Luckey—You have asked a deep question. It is the case with any contagious disease, probably without exception, that only a certain per cent of those exposed will become infected. Nature is a much stronger preventive of disease than anyone who has not made a study of disease would think. Nature fights all of these diseases and in some cases it appears the resistance is sufficient and the animals escape the infection.

Mr. Belle —Do you not believe to some extent the offspring of hogs that have gone through the cholera and still live are less subject to cholera than the offspring of those who have never had the disease?

Dr. Luckey —You spring a question of hereditary immunity. We have no authority on it, but we think no animal inherits complete immunity. In the case of Texas fever, the indications are as far as we are able to observe, that immunity does not seem to be inherited. Nor do I think it can be inherited in hog cholera. Partial immunity may be inherited in some cases. Immunity may be conferred to a hog that is the offspring of a sow that has cholera, but it is not safe to count on such pigs being immune.

Mr. Belle —I have had some experience of that kind and it looked as though the pigs were immune.

Dr. Luckey —It may have some effect toward producing immunity.

Mr. Robinson —Can swine fever be caused by too much green corn?

Dr. Luckey—I do not know any distinct disease we recognize in our profession as swine fever. Of course a hog is susceptible to indigestion, anaemia and all kinds of parasites as well as any other animal, but the greatest loss to hogs comes from hog cholera and swine plague, possibly including worms.

Mr. Canaday —Is swine plague the same as hog cholera.

Dr. Luckey —Swine plague is due to a different germ and swine plague germs are found principally in the lungs.

Mr. Canaday —Swine plague does not kill as fast as cholera.

Dr. Luckey—No, it does not kill as fast as cholera but it is fatal, though not so highly contagious as cholera. The germs have not the virulence that the cholera germs have. Swine plague often occurs in connection with hog cholera. A hog often has swine plague and hog cholera at the same time. And it is well here while we are discussing the two diseases to mention the points by which we distinguish hog cholera and swine plague. Swine plague is an affection of the lungs, causing in them a red congested area which anyone can recognize. If you want to examine for the lesions of hog cholera, take out the digestive organs and open the intestines from one end to the other and examine the walls thoroughly and you will find in them what we call the cholera button ulcer, a rough elevated surface like a button on the walls

of the intestines, with a white appearance. These are the points by which we recognize hog cholera. The germs have been carried to every part of the body and they roll in balls and block up the smaller blood vessels.

Mr. ——— —Is it a fact that you have more trouble with hogs immediately after you commence feeding a new crop of corn than at any other time?

Dr. Luckey —I have never observed that, and there are no scientific facts to bear out that conclusion. But farmers believe green corn and acorns produce hog cholera.

We know you can feed a hog any kind of feed and any amount of it and as long as you keep the cholera germs away it will not have the cholera. Otherwise he will have it whether he gets feed or not. A friend of mine at Sheridan adheres very firmly to the opinion that hog cholera is caused by feeding green corn.

Mr. Canaday —Does not the time of the year have something to do with it?

Dr. Luckey —The time of the year has nothing to do with it, the kind of feed has nothing to do with it and the general surroundings of the hogs have very little to do with it. If you keep your hogs on a floor that is scoured every morning and disinfected and let a dog carry a piece of carcass from a neighborhood where the hogs have died of cholera, you will have hog cholera, and all the disinfectants you can buy will not keep it out. That is one point we want you to remember thoroughly that the disease germ must be introduced among your hogs, and if you stop to think you will see that the disease comes from some other carcass. If you burn the carcass of a hog that dies of cholera, you may save your neighbor a great loss.

Mr. Robinson —Is there such a disease as measles among hogs?

Dr. Luckey —Yes. It is a very dangerous parasite, too. The parasite that causes measles in hogs, if eaten without proper cooking, develops in the human digestive organs as tape worm. The effect is very bad on the people themselves and we try to keep measled hogs from being put on the market.

Mr. Sydnor —I think the trouble with green corn is during the season prior to green corn these hogs are without corn, their systems are down low and they are put suddenly upon a great amount of green corn.

They eat a great deal of it. Their constitutions are impaired and they take hog cholera. A few years ago a good many hogs were shipped in from Nebraska for several years into our county and nearly every bunch shipped in died. When they brought them in they were mere skeletons, they had been starved to death nearly. A friend of mine was going to buy some and I advised him to ship them through and not unload them at Kansas City, but take them out on a side track and unload them in his wagon and take them home, and not to feed them too much, and he would have no trouble. He bought a car load and did not lose a hog. He brought them right through and did not unload them at Kansas City or at the cattle sheds at home, but unloaded them in his wagon on the side track and let them have a little grass, and commenced feeding them a little at a time and did not lose a hog. All these other parties that commenced feeding these hogs right away lost them. I think that is the reason.

Mr. ——— —Maybe they unloaded them at Kansas City or some point where they were exposed.

Mr. Sydnor —That may be true.

Mr. Robinson—What is the cure for measles?

Dr. Luckey —You can not do anything to cure measles. That parasite is inserted in the frame of the pig in a way you can not cure it. The only thing to do is to keep people from eating it. It is highly contagious.

Mr. Robinson —Is there not a disease something similar to measles in the human family, among hogs, where they have a breaking out?

Dr. Luckey—What is the nature of the breaking out?

Mr. Robinson—It looked like smallpox on a person, or scarlet fever. The remedy applied was carbolic acid and fish oil and the hogs got well.

Dr. Luckey—That was some local affection, poison or something of that kind. That was not measles at all. Probably mange.

Mr. Robinson—Is there such a thing as thumps?

Dr. Luckey—Yes.

Mr. Robinson—Is there not some other disease that causes thumping?

Dr. Luckey—It is hard to tell the cause of thumps, as different diseases terminate in thumps. The hog may be affected with worms. I

have noticed thumps in hogs that were wormy. If they are debilitated from any other cause, it produces a spasm of the diaphragm which is thumps.

Mr. Schooler—I noticed in the veterinary column of one of our stock papers a man inquiring what to do for his pigs, and the symptoms that he gave indicated worms. The veterinarian answered that the pigs had worms and for him to take four ounces of powdered santonin and ten pounds of epsom salts and half a pound of ginger and six pounds of soda and a half bushel of shorts and a peck of oil meal and mix it together thoroughly and then take about a quart of that and put it in the slop or swill for twenty head of fifty pound or sixty pound shoats and use it three or four times a week. It seemed to me that was a common sense remedy and I commenced using it occasionally when my pigs would show indications of worms, and I found it very satisfactory. For instance, last spring I was away from home a while and could not give my pigs the attention I should, and when I went to look after them I saw indications that they were affected with worms and not looking well and I mixed a good deal of this mixture and commenced feeding it to them pretty strong. Instead of a quart, I put in half a gallon of this mixture, doubled the dose and fed it twice a day and it was not more than a day and a half or two days before I began to see the effects of the medicine and my hogs were soon all right again. I have given that receipt to a number of farmers living near me and they all appear to like it well, and it seems to answer the purpose.

Dr. Luckey—What was the purpose for putting in ginger?

Mr. Schooler—I suppose the intention of putting in the ginger was to prevent griping. The soda has a tendency to sweeten the stomach. Of course the oil meal and shorts diluted the other ingredients.

Mr. Boles—Is it not a fact that oil meal alone is one of the finest things ever given a hog?

Mr. Schooler—I like it myself very well, but I do not like it to give to pigs when they are too small.

Mr. Boles—In regard to a dose of medicine we generally give a hog or anything else, where you double the dose, it is generally found to be more beneficial than to follow the directions of the veterinarian or anyone else. I know that to be true in some cases in sheep. I wanted to know what was the general opinion of the crowd here. I believe

myself if we will double the dose or treble it we will generally be more successful.

Mr. Schooler—I think it would be well to experiment before we begin to double up too much.

Mr. Canaday—In some medicines we might double the dose and the remedy would be worse than the disease.

Mr. Boles—I want the experience of those who have tried it.

Mr. Canaday—Likely their experience would be of advantage.

Mr. Schooler—After we have given hogs calomel, don't you think we should keep them dry and not allow them to wallow in mud holes or water?

Dr. Luckey—There is no reason for thinking it necessary to take any precautions in that respect. I do not know that it will hurt a hog to get wet after giving him a dose of calomel. Probably it would have some effect. It is generally believed that it is not well for a person to get wet after taking sulphur or calomel, but very few people stop to think about it. I do not see how it could have any effect on a hog to get wet after having a dose of calomel.

In regard to giving these doses, I hear things once in awhile that I think highly practical. At the farmers' institute this fall one gentleman explained how to give santonin to hogs affected with worms. While some hogs get more than their share others get none. He took the time to measure out the santonin in doses and see that each hog got his dose. He had pigs which were rather tame and they came through a little chute and as each one got there he dropped a ball of the medicine to him and in that way he dosed the whole lot and guaranteed that each pig got his dose, and none too much. He followed up the santonin with salts. It is an important thing not to let one pig get all the medicine, because that will not help the others any.

Mr. Belle—Is it not a fact, Doctor, that hogs that are not in the very best condition are not nearly so apt to die when they take hog cholera or swine plague as those in good condition?

Dr. Luckey—It would seem that a hog in good condition would have a greater power to resist the disease. That would be the philosophy of the thing, but the practice is that that hog will die as quickly as the sickly one. In the case of southern fever, the steer in good condition dies more quickly than the one not so well. I do not know why,

but it is often observed that some of the fattest or healthiest ones succumb to the disease first.

Mr. Belle—Is flesh any indication of health?

Dr. Luckey.—Some indication.

Mr. Belle—Then why is it men who live to be eighty years old are always lean?

Dr. Luckey—It does not apply to men. As a rule healthy stock fatten and unhealthy stock do not? The rule does not apply to men.

Mr. Boles—The reason I asked that question, I know a gentleman that has been dosing some sheep and instead of giving one dose for three days and quitting three days, he has given three doses a day for six days and then two doses a day for a week or more, or two doses a day for six days.

Dr. Luckey—What was he treating?

Mr. Boles—Sheep. He doubled the dose and trebled the dose and the sheep got well.

Dr. Luckey—If you are ever sick, instead of having a physician like Dr. McAlester, you want a horse doctor.

Mr. Canaday—In the absence of Mr. E. W. Robinson, of La Belle, Mo., who was to have a paper on "Swine Industry in Missouri," we will proceed with a discussion on that subject. I would like to hear from Col. Rippey who has not been saying much and who has talked to a good many men about the industries of Missouri.

Col. Rippey—Col. E. W. Robinson, a breeder of Poland Chinas, I believe, at LaBelle, has this subject thoroughly in hand and wrote me positively he would be here this afternoon. My impression is the assessed value of swine in the State has almost doubled within the last three or four years. I saw in the papers a report the other day saying there were about four million head of swine assessed for taxes in the State this year or last year, against two million, three hundred thousand some four years ago. I have no further statistics and can make no further talk.

Mr. ———Do you want a general discussion of swine feeding?

Mr. Canaday—We might talk a while on that.

Mr. ———I have had some experience, Mr. Chairman, as a raiser and feeder of swine. Someone asked a while ago if green corn causes hog cholera. It reminded me of something I was familiar with

when a child, that shows the credulity of people and their tendency to reach wrong conclusions. In the old fields of Virginia strawberries and blackberries grew everywhere and day after day we ate them and the children were affected with boils after eating the blackberries and the parents went through a process of reasoning and came to the wrong conclusion that the blackberries were the cause of the boils. I think the question about green corn can be answered in this way, the hog has been running on grass and is not healthy and when he commences on green corn the farmer overfeeds him and gets his system out of fix and it shows up in some form and we conclude green corn is unhealthy. I think it is about as healthy as anything.

The same thing is true about cattle. It illustrates the point I want to make. You may go to Kansas City and buy a hundred head of western cattle and bring them into Missouri and put fifty on the corn field and fifty on the stalk fields, and the cattle fed on the stalk field would be as heavy as the one fed corn all the time. They would get used to corn by degrees in the stalk field and do as well as the others. We want to use our common sense in that line.

I want to get back to the hog business. I have fed hogs more or less all my life. Hogs do not catch the cholera except from a cholera germ. If cholera gets on a stream, everybody below the infected hogs on that stream is sure to have it among their hogs. I think myself the doctor's theory is all right.

Mr. I. W. Belle—The fact of the business is when hogs are not healthy they get lazy and I have seen them full of lice. It is not strange that it should be so and I expect in some cases that is the main trouble with them. I usually buy hogs that are not healthy. I frequently find them thumping and put as many of them on the scales as the scales will hold and take a quart of crude carbolic acid and three gallons of coal oil and sprinkle them and after ten days I sprinkle them again, and in that way rid them of lice. I take concentrated lye and copperas and feed them with oil meal dry. Put the trough where the cattle can not get at it and feed it dry, and while the hogs are fond of it, you can scarcely believe it, but they will not eat over twenty-five pounds. Twenty-five pounds is about what a hog will eat in a day of twenty-four hours. I keep this by the hogs all the time and it is the finest remedy

I ever tried. I have had very little trouble with the hogs when I give them the care and pains I speak of.

I know if my neighbor gets the cholera my hogs will die if not taken proper care of. I think the best thing for one to do for hogs that have cholera is to cook the dead hogs and make the live ones eat the cooked carcass. I have done that with good success. My hogs stopped dying and got well.

I raised the question here a while ago about healthy hogs not succumbing to cholera as easily as unhealthy ones. In a small way and only in a small way I have raised thoroughbred hogs and had them exposed to the cholera, and never lost ten per cent of what I had. I believe that by keeping them in a perfectly healthy condition, they will resist disease. And that brings up another question, I do not feed but little corn. I raise my hogs as nearly as possible without corn. I feed them slops and shorts and such things as that.

Ellis—The number of hogs in Missouri on June 1, 1900, as reported by the assessors, was 2,415,760, valued at $4,925,379. The actual value of the hogs in the State on that date was probably more than $15,000,000. On June 1, 1890, the number reported by the assessors was 3,249,390, which is 833,630 more than we have now. The total value in 1890 was $5,438,943, which is $513,564 more than in 1900. It may be interesting to know that Missouri has a greater number of hogs than England, about 40 per cent as many as France, more than 180 per cent the number Italy has and 35 per cent of the number in Russia. Truly the "Missouri hog" is a great factor as a home-builder and mortgage-lifter and should be given a place at the "head of the table" in every farmer's feed lot.

Missouri State Grange.

WEDNESDAY, December 12, 2 P. M.

Reported by Miss Snowdon Willis.

House called to order by Worthy Master, C. O. Raine.

Mr. Raine—Ladies and gentlemen: We are glad to meet you at this time and meet you in this beautiful city of Fayette and have this pleasure of presenting to you this afternoon a part of the work of the great organization—great farmers' organization known as the Grange, which is no new institution in these United States, not even in Howard county. Without further remarks upon this subject, more than to reaffirm that we are glad to meet so many of you under these very favorable circumstances, we shall proceed to present to you the work that has been laid out, with the regret, however, that two or three of the speakers on the program will not be with us. We had expected Hon. N. J. Colman, and I learned that he had not yet arrived at the noon hour. If he comes he may possibly get in before we close. We expected quite a treat from Gov. Colman. We had also expected the Hon. Aaron Jones, worthy master of the National Grange, but I received a letter from him yesterday saying that their association at Indianapolis was in session and it required his attention there and consequently he will not be with us, he being Master of the State Grange of Indiana.

Col. G. W. Waters, of Canton, took the chair.

Mr. Raine—It was only yesterday afternoon that I was apprised of the fact that I would be expected to deliver my annual address to the organization before this assembly this afternoon. It is frequently the case that these addresses are delivered in public. I had not prepared this with a view of presenting it to the people here at this time.

ANNUAL ADDRESS TO STATE GRANGE.

By Worthy Master, C. O. Raine, Monticello, Mo.

Officers and Members of the Missouri State Grange:

It gives me great pleasure to meet and greet you in this our 29th Annual Session, to review the work of the past year and to counsel together for the future welfare and progress of our organization. The Grange as an agricultural organization holds first place socially and educationally in the hearts of our people, and is destined to be the Herculean leader of the farmer to a higher and better manhood and womanhood.

The interests of our order and those of the State are closely allied. The first plank in our platform is "United by the strong and faithful tie of agriculture we mutually resolve to labor for the good of our order, our country and mankind."

This should be the inspiring motto during the session upon which we are entering. The work of the session may properly be divided into that which pertains to strengthening the organization and that which has direct bearing through this organization upon matters of public concern. These we will consider in their proper order.

CONDITION OF THE ORDER.

The condition of the order is not what we would have it. While there has been an interest manifested and an increase in some parts of the State, there has been a lack of interest and a decrease in membership in others. Six granges have been re-organized. Altogether the order is stronger and more vigorous than it was one year ago.

FIELD MEETINGS.

The field meetings and grange picnics that have been held this year have given strength to the order, in their several localities, and I would recommend that preparation be made early in the season for more of these meetings as they bring the principles and teachings more prominently before the public.

MUTUAL FIRE INSURANCE.

The farmers' mutual fire insurance companies should be patronized by everyone having an interest in fire insurance. The Grange Mutual Insurance of Lewis county is the pride of the patrons of that county; organized twenty and a half years ago and has had twenty-three assessments at an average of twenty-one and 12-23 cents on the one hundred dollars per year. It is a saving of fifteen to twenty thousand dollars to its members.

RURAL MAIL DELIVERY.

One of the greatest achievements of the grange has been the establishing of rural free mail delivery. The Grange was the first to advocate that if it was right for the government to deliver the mail to the people of the cities it would be equally right and just to carry mail to the people in the country. At the beginning of the fiscal year 1899-1900 the number of routes in operation was only three hundred and ninety-one and most of these had been running less than twelve months. By the 15th of November, 1900, the number had increased to two thousand six hundred and fourteen, reaching into forty-four states and territories and serving a population of 1,801,524.

Postmaster General Smith says:

"Rural free delivery has now been sufficiently tried to measure its effects. The immediate and direct results are clearly apparent. It stimulates social and business correspondence and so swells the postal receipts. Its introduction is invariably followed by a large increase in the circulation of the press and of all political literature. The farm is thus brought into direct and daily contact with the currents and movements of the business world. A more accurate knowledge of ruling markets and varying prices is diffused and the producer, with his quicker communication and larger information, is placed on a surer footing.

The value of farms, as has been shown in many cases, is enhanced. Good roads become indispensable and their improvement is the essential condition of the service. The material and measurable benefits are signal and unmistakable.

But the movement exercises a wider and deeper influence. It

becomes a factor in the social and economic tendencies of American life. The disposition to leave the farm for the town is a familiar effect of our past conditions. But this tendency is checked, and may be materially changed, by an advance which conveys many of the advantages of the town to the farm. Rural free delivery brings the farm within daily range of the intellectual and commercial activities of the world, and the isolation and monotony which have been the bane of agricultural life are sensibly mitigated.

It proves to be one of the most effective and powerful of educational changes. Wherever it is extended, schools improve, the civic spirit of the community feels a new pulsation. The standard of intelligence is raised, enlivened interest in public affairs is quickened and better citizenship follows."

GOOD ROADS.

The necessity for and advantages of good roads are of momentous importance in our State, conventions have been held and legislation sought, but a practical, systematic plan of road building is for the future to determine. It has been said: "The civilization of a country is measured by the character of its roads." We would urge the granges of the State to give this subject earnest consideration in securing feasible and practical legislation.

EDUCATION.

The chief aim of the grange should be education. It should aim not only to educate the farmer and his family for the noble discharge of the duties of citizenship, for educational exercises in grange hall, but to perfect our public school system and to develop the agricultural department of our Agricultural College and increase its patronage to the extent that our boys and girls will look upon agriculture as the greatest, for profit and pleasure, of all occupations.

Germany and France and little Switzerland realized fifty years ago that agriculture in its various departments must be pursued with the aid of the latest science combined with the broadest experience. These countries have not waited for the laborer to perfect himself in experience—an impossible attainment—but they have opened schools

of every possible grade, arranged courses of lectures by the best educated scientists, made elementary agriculture a compulsory subject in the curricula of the common schools, sent out traveling instructors to confer with and advise and give courses of lectures to the older farmers, made it possible—even compulsory—that young people should attend technical schools at odd hours of the day or evenings, and even tempted them to pass a severe examination in their respective studies by the offer of a valuable prize as the reward of success.

It has been said that Chas. Dickens once made a speech at an agricultural dinner in which he somewhat derisively said that: "The field it paid the farmer best to cultivate was the one within the ring fence of his own skull." Dickens was correct. The farmer needs scientific education. The best civilized and most progressive nations of to-day are admitting the utterance of Dickens to be a serious truth.

THE PUBLIC PRESS.

In the consideration of up-lifts we must not over-look one very potent factor, the press. As the far reaching and enlivening rays of the sun pervade the atmosphere, so does the press influence the home wherever it enters. For the Grange it is a house to house canvasser, the educator and concentration of Grange thought and action. Greater support should be given to our grange papers and farm journals, for through them is the communion of farm life carried on. We deem the public press a direct means of strengthening and advancing the interests of our order.

DORMANT GRANGES.

This is a question of great importance to the patrons of Missouri and one upon which much has been written. In looking over the pages of the past there seems not to have been a united effort upon the part of our patrons for the consumation of the great work begun. We find that where the true members have been interested, there the grange has prospered.

LEGISLATION.

The National Grange at its recent session re-affirmed its former

position on the following: in securing which I earnestly request the co-operation of the Grange in Missouri.

1st. The passage of what is known as the Grout bill, regulating the sale of oleomargarine.

2d. Providing for postal saving banks.

3d. The enacting of an anti-trust law.

4th. Election of United States senators by direct vote of the people.

5th. Pure food law.

6th. Construction of the Nicaragua Canal.

THE NATIONAL GRANGE.

The 34th Annual Session of the National Grange was held in the beautiful city of Washington, the birthplace of our order. This session was honored by the presence and counsel of two of the founders of our organization in the persons of Brothers O. H. Kelly and John Trimble, its present efficient Secretary. Brother Kelly was the first to advocate the principles of the Grange and was the first master of the National Grange. It has been said that "To be remembered one must build his own monument." Certainly such has been the work of those who gave the Grange its existence. The address of National Master Jones was as usual an able Grange paper of which I ask your careful consideration. The reception tendered by President McKinley was attended by a large number of patrons.

Pastmaster J. H. Brigham, the present Assistant Secretary of Agriculture, also gave a reception at his home to show the grangers, as he said, "How a farmer lives in Washington," and very materially assisted in the work of the session by his wise counsel.

Reports of state masters indicated a prosperous condition of the order in most of the states. All action taken was fraternal and harmonious.

CONCLUSION.

And now, worthy patrons, as this session closes my term of office, I desire to express my sincere thanks to you for the courtesies shown me and your co-operation in successfully carrying out the work of

elevating and building up our order, and ask for my successor only a more united and harmonious co-operation even than has been given to me, and as admonished in our ritual: "Cherishing in our hearts every kind feeling towards all other orders and associations which seek to promote human welfare, let us strive with them, working hand in hand for the good of our fellow beings." Let us remember that amid all that is bright and beautiful in nature there is nothing that blooms with such unfading colors as the flowers of good works and there is no perfume on earth with such fragrance as the sweet smelling savor of that pity which feels for the wants and relieves the distresses of our sisters and brothers,

Mr. Raine—We will now be favored with an address by Miss Zabriskie upon the subject of Household Economics.

HOUSEHOLD ECONOMICS.

By Miss J. L. Zabriskie, Columbia, Mo.

Some one has given the following definition of the word "Home." "Home is a place and an opportunity for the highest development of our physical and spiritual natures."

It is not then, merely a large box to protect us from rain and cold. It is not simply a place to cook, and a place to sleep and a place to wash. It is not altogether a material thing. It is the keystone of our life. It is almost life itself. It is largely what makes men and women good or bad. Our home permeates our very nature.

Throughout all the ages from the time of the first fire building, home making has been the problem of women. When woman was first allowed to attend school we would naturally suppose that her foremost aim in obtaining an education would have been for the purpose of improving her ideals and methods of this same home making. But not so.

We have quartered the earth and subdued it: we have burrowed beneath its surface; we have measured the ocean's depth; we have

diligently striven to reach the north pole; we have exultantly explored the heavens with telescopes. But we have not learned in all our wanderings this simple precept "Look at Home."

And in looking at the homes of our country what do we find; all kinds and descriptions. Let us examine the lives of the poor in the cities. How do the people live; what do they eat?

In a dietary study made among thirty average tenement houses in Brooklyn, N. Y., we found that the ordinary diet comprised tea (kept boiling on the back of the stove all day long and therefore ten times as harmful as tea properly made) together with bread, pie and cake obtained from cheap bakers, and much adulterated. A meal warranted not to feed. Do we wonder that the saloons prosper?

Again our population is made up largely of foreigners. The markets of this country are unlike markets of other countries and our cheapest and best food stuffs are totally unknown to most of the immigrants landing on our shores.

An Italian laborer in New York City who received eight dollars per week, who with his large family occupied one small room, was found to eat chiefly baker's sweets and the best pure olive oil, or else go supperless to bed. Had the mother known the possibilities of cheap American food materials she would have been able, for the same expenditure of money, to secure nourishing stews, palatable soups, and numerous dishes made from our abundant cereal products.

But too, on the other hand, is not the study of Household Economics almost as valuable for the rich as for the poor? Women have hitherto been supposed by the gallant but erring men, to be gifted with a divine intuition regarding household matters, and have been expected to perform their duties or control their servants by means of a super human instinct. Imagine the Superintendent of a factory doing his business by instinct.

The success of an executive business man depends largely upon his knowledge of details. Is it not equally true that if the work of the house is ever to be systematized and conducted with ease and success, housekeepers must become familiar with every detail of routine work? Things become simple as we learn to do them properly.

Again, because people have money does it follow that they live in a more hygienic manner?

By the most practical scientific experiments it has been proven that a man requires a balanced ration. The quality and finish of your sheep or cow depends largely on its feed. We are but animals. Savarin once said "Tell me what you eat and I will tell you what you are."

Are the rich more apt to secure a balanced ration than the poor? On the contrary the rich have every opportunity of pandering to a capricious spoiled appetite—and upon considering the number of indigestible dishes consumed by them as a class, we believe that they take advantage of the opportunity.

The intelligent feeding of a family
The intelligent clothing of a family
The intelligent housing of a family

is a labor of dignity. It is a profession worthy of study. The study of Household Economics is important alike for the woman of means, for the factory girl, for the trained nurse and for every one. It is important for the farmer's daughter.

In the first place, to the woman on the farm, the home means more than it does to many a city girl. Not having all the distractions of city life, a country woman is free to center her interest in her home and to idolize the home—to make it yield rest and refreshment and inspiration to all the members of the family.

She has in abundance the first requisite in a well kept home—something for which her city neighbor cries in vain—plenty of good fresh air. Oh! the glory of it—air and sunshine too. She can flood her house with them; she can adjourn to the neighboring woods and sleep on a bed of pine boughs and secure all the air she wants if she would.

A farmer's wife in New York state last summer arranged a combination kitchen and dining and sitting room out under the trees in her back yard. Here the washing and ironing were done; the canning and preserving; the vegetables prepared for dinner and the family mending basket reduced to bareness.

Again, a country home is the easiest kind to make attractive from an artistic standpoint. The little ground about the house is full of possibilities and can be made so inviting that the traveler longs to enter. Nothing is more hospitable than the farm house sitting room with its

wood fire, its worn carpet and its cheerful plants and shelf of books. How much more we love it than the parlor. Why do we have to have parlors? Stiff places; nobody likes them. A good wide piazza taken all in all is a much greater comfort than a parlor, and tends to a healthier mode of life. A farm house, from the shady trees in front to the quaint little bed rooms tucked under the eaves, can be and should be, the most home-like of all homes.

It is acceded at last by poet, philosopher, scientist, and the up-to-date woman, that the country is the place in which to live, provided we live in it in an intelligent manner.

If we study and apply the physical and chemical laws governing matter, butter and bread making lose much of their drudgery and become beautiful chemical experiments. Oh! the joy of broiling a steak when we know just what is happening to the steak inside as well as out, and the positive pleasure in watching a pot of water boil when we reason out why it boils, what the bubbles are made of and why they break on the surface. But the question arises, have we time for these things?

Let me ask—have we time to omit these things? How many steps we would save, how many hours would we save, how many failures would we save, if we always knew not only the right method, but also the "why" of doing things.

Men always find an easy way of doing their work. If a man had to keep house and cook, he would have his kitchen arranged with some method, his pantry near his sink, and his work-table near both. Woman still walks many unnecessary miles in her kitchen.

Granted that woman's work *is* more difficult to simplify than man's, yet, if science study can ease matters, do give science a chance.

Mrs. Ellen H. Richards of the Massachusetts Institute of Technology has done more for the scientific study of the home in all its aspects than any other person in this country. Largely through her efforts extensive work in Household Economics has been carried on in Boston.

Drexel Institute, Philadelphia; Pratt Institute, Brooklyn, N. Y.; Teacher's College, New York City; Armour Institute, Chicago; and many other schools, among them our own Missouri State University all train teachers for this work.

Many of the Agricultural Colleges throughout the country have

excellent courses. The womans' clubs all over the United States have become most enthusiastic and have been the means of establishing cooking and sewing in the public schools in many, in fact, most of our cities.

In Missouri the work is more than promising. The Womans' Federated Clubs are taking up the cause and are endeavoring to get every woman in Missouri interested. Every county has, or is to have a chairman, and each chairman will appoint two members to serve with her on a committee. This committee is to further the work in every way possible, to encourage clubs to pursue a study of the subject, to get every woman in the State interested, to buy a few inexpensive books on the subject and to send as many girls as possible to regular Household Economic training schools, and also to establish philanthropic work for the poor.

The work at the Missouri State University has made its beginning, and a most auspicious beginning we feel it to be. We have a kitchen and dinning room, twelve little gas stoves and as many desks filled with cooking utensils. We have chemicals for testing foods and all of the best books bearing on the subject.

Our work is divided into two classes.

First, there is a one year course adapted to the needs of the average woman. The time required is six hours a week. This leaves time for work in other subjects in the School of Agriculture or the Academic department. In this course we aim to give the students not only a working knowledge of cookery but also work in dietetics, food composition, marketing, etc. House sanitation and house architecture are discussed. The subject of house decoration receives much attention.

If six persons were given $200 each with which to furnish a house, the results would be very different. Some would be complete, harmonious and always restful; others gaudy attempts to be stylish. Still other homes would be filled with chairs too delicate to sit on, tables too rickety to bear usage; sofa pillows too pretty to touch.

We aim to give the students lessons in color, form and design. To show them what is worth while in decoration and to suggest possibilities for making inexpensive things cozy and attractive.

A course in practical sewing will be offered as soon as possible. The department at present is over crowded with students in the line of

cookery and without another teacher we can not well arrange for the sewing.

But above all we aim to get the girls interested in their homes—to make them love their homes and be willing to make sacrifices for them, but to sacrifice in an intelligent and enlightened manner.

The second course is adapted to meet a demand which is rapidly making itself felt throughout the State.

If we are to have cookery and sewing taught in the public schools of Missouri, we must have cookery and sewing teachers. It seems to be the one profession in which the demand is greater than the supply. A school board in looking for teachers naturally turns to the State University.

For our full normal diploma we require two years work. This includes outside of cooking and sewing a certain amount of natural science and pedagogy.

Owing to our unlimited laboratory facilities in Chemistry, Physics and Bacteriology, we consider the course equal if not superior in some respects to any other training school.

As we before stated, we have made our beginning. We are looking forward to a bright future and we ask for your co-operation and your support.

CHOOSING A PROFESSION.

By Col. G. W. Waters, Canton, Mo.

After hearing the preceding address, I certainly should have no difficulty in pointing out what profession a young lady should choose, and that has left me only the task of talking on what profession a young man had better choose, because the outline given by the splendid address just preceding this has certainly pointed out the thing for the girls to do. Now I do not wish to detain you long, but the question of choosing a profession, while it does not concern a great many of those present

here personally, it does concern, I dare say, all of you, because it concerns those in whom you are interested, those growing up around you and about you in whom you are very deeply and very greatly interested, and this question or this matter of choosing a profession, of choosing a calling in life, is one of the most momentous questions that comes before any youth, as we all will realize. Choosing rightly, choosing aptly, choosing a profession for which a person is fitted, with a given degree of energy, perseverance and proper application to their business, would undoubtedly lead on to success, barring a want of health or some misfortune. Choosing erroneously, choosing wrongfully, choosing a profession for which this young person is not fitted, might mean, and would often mean disaster. I believe it was said by Brutus when he was talking to Cassius:

> "There is a tide in the affairs of men,
> Which, taken at its flood, leads on to
> fortune;
> Omitted, all the voyage of their lives
> Is bound in shallows and in miseries."

In this case, as we see it, the choosing of a profession would mean to choose appropriately and choose rightly, and it would be taking the proper tide that comes in every human life.

Now there are two considerations, two things that enter into this, about which we ought to say something. We have suggested the first, that of the fitness of the youth for the profession, because each and every one of us is not fitted for each and every calling. We see that illustrated often. We realize that there is some truth in the old adage or statement which has been handed down from Roman days, that "A poet must be born and not made." So likewise, in a greater or less degree, a person must be born and fitted naturally, we may say, for some professions differ very materially from some other professions, and all the training that could be brought forward or all the effort that could be made and given to anyone if he were not fitted for a poet, would never make a poet of him. We have some very notable cases in history where men have chosen that calling for which they were preeminently fitted, by heredity, if you please, and by early environment in life, so that the whole trend of their lives was in keeping with the business they chose, and we see how they have gone on aptly fitting their calling to

nature and why they have gone on to splendid success. I take one of the most remarkable instances, out of the natural order of things, in some sense, taking the case of Napoleon, who was born within the sound of the cannon's roar as the battle was in progress. He was laid as an infant upon a mat emblazoned with embattlements and pictures of armies, his father a general in the army and his mother of a military spirit who entered campaigns with her husband—Napoleon, born with military spirit, born with the environment of military activities—his very nature was military and he became a great and notable leader of armies, a great conqueror and the world's greatest human butcher. This is an extraordinary case, I grant you, but at the same time, this very fitness for the calling begets a love for it. Now let us mark these thoughts along here because if we have not a love for our calling, if we have not that love for it that begets an inquiry into its uses or into its needs, and if we have not such a love for it as will cause us to study the details of the business, or in other words, if we have not such a love for the business that we follow as will cause us to give ourselves the proper education for it, we will not succeed, and the young man or woman who chooses a calling in which he does not feel this interest, having his mind, it may be, on some other business that he would rather follow, will not study his business in that detail and in that way that shall point out to him the best thing to do in every instance that comes up. The first requisite on the part of a young man or a young woman in choosing a profession would be to find out if possible for what profession he is best fitted, and if by reason of strong muscle and by reason of a trend of mind in that direction, he would make a splendid mechanic, do not try to make of him a preacher; or if by reason of ability physical and mental in that direction and a love for those things that are natural that young man is eminently fitted to till the soil and learn the things that are necessary to be learned in agriculture, if he is well fitted for that, do not make the mistake of trying to make of him a possibly detested wielder of the birch in a country schoolhouse, which you know sometimes occurs. That is one of the first things, and it is perhaps, I may say, the most difficult thing to determine in this question of choosing a profession, because our young men, fired as their minds are with an ambition to excel, and desirous of reaching some high standard of excellence, take for their great exemplar some noble character, some great

person; they have their ideal and try to reach it and the chances are that to which they possibly have given this attention is the political field.

We find that it often happens that the young man, especially, is fired with a desire to become a great orator, politician, governor of the state, member of congress, or some other great and notable person. Let us look at this a little bit calmly and in choosing a profession, let us calculate just as we would in any other enterprise. If our children will not calculate, let us calculate for them. Let us find out that those who succeed in this political arena have not reached the goal of their ambition often times; in fact it is an absolute necessity that a very large percentage of those who start out with political ambition must fail at the start, because there are many that think they are called to serve their people, but few are chosen. Even those who attain success in this department find that often times their lives are embittered by many things happening that they did not expect.

In yesterday's *Republic* I read of a case of a former governor of Ohio, an almost idolized man in Ohio, for two terms governor of that state, who is now in bankruptcy, whose check for twenty-five dollars was dishonored by his own bank and who is to-day in penury and want.

Just a little while ago (I do not remember the date), there was published in a St. Louis paper a resume—a history of the politicians of the city of St. Louis—the notable ones. Their names were not given, for obvious reasons, but it describes these men who had walked forth before the people, scintilating stars of honor—meteors. These politicians had had it in their power to dispense offices. Thousands and tens of thousands of dollars went through their hands to their political friends. They had dispensed the emoluments and favors of office when in the zenith of their glory and had been men of wealth and property, but every one had like Lucifer gone down and down and nearly all were to-day on the streets of St. Louis, some begging dimes for drinks from their former friends. And even a large percent of those who have succeeded in politics subsequently fail before the end of their lives. Therefore we would say, do not choose the political profession.

We are taking the negative side of this question first. Let us take the mercantile profession. Let us scan their broad streets and dense

roofs and look into the history of mercantile pursuits and analyze that question and see the fate of those who enter the mercantile ranks. And I am going to say that the young man who is fired by zeal from reading in mercantile journals those things that have happened, of those who make millions, let us calculate, examine these records, and if they tell us truly eighty-five per cent of those who embark in mercantile pursuits fail. I can recall to my mind in Canton six out of seven men who have failed in the mercantile business, and I believe that the possibilities in mercantile pursuits for the young men are not such as will make it best for them to enter that field hastily.

Let us examine some other lines of work. Marvelous changes have taken place in the United States in the last thirty years. Never in the history of any people on earth has there been such progress made, so many new developments and new activities opened up. Take transportation, the telegraph, the telephone, electricity, engineering, all these things have brought forth a myriad of businesses unparallelled in all history, and as a matter of course there have been demands all along these years for those that are equipped and qualified in many particulars to occupy positions in these pursuits, and this has attracted a great many. I think the last railroad reports say there are over one million employees engaged by the railroad, besides the great multitude employed by the telegraph companies and others. The young man looks on and sees some splendid achievements along these lines, even as an employee. He says, "I see a splendid position occupied by this man who but a few years ago took a low place along these transportation lines. He entered as a brakeman and rose to be an engineer or rose to be a conductor on a freight or passenger train, rose still higher in transportation lines until he was a passenger agent, or something of that kind." Again let us notice and see how many of those who enter this line of work really reach a high position. Let us counsel our young men and tell them that many have entered this line of work who have not been heard from.

The Agricultural Association of New England a few years ago made investigation as to how many young men who grew up upon the farms of New England were now upon the farms, and the startling figures were presented to that society that eighty-six per cent of all the young men who grew up upon the New England farms had gone to the cities. Such a great per cent of farmers' sons in the west have not gone

to the cities, yet a great surge of them has swept into the cities, and where are they now? You may not know where they are, save as individuals, but let me tell you where some of them are, some of them are ground down under the oppression of a taskmaster, to-day; some have gone to school lands and some have gone to the ranks of labor and they to-day are not enjoying the independence they had upon their fathers' farms and that they would have had, had they stayed upon their fathers' farms. I do not wish to create the impression that one legitimate profession is less honorable than another legitimate profession because we all know: "Honor and shame from no condition rise; act well your part, therein the honor lies;" but while that is true, there are hardships that fall to the lot of the wage earner that the farmer knows not of—hardships that are capable of producing such impressions that would enable the genius of the artist to draw a darker picture perhaps than from any other source of human history. Take the statement of Robert Burns when he looked out upon the great labor class. He chose one individual who was seeking to get employment and failing to get it, and broke forth in this most sad refrain:

"See yonder poor, o'er labored wight
So abject mean and vile
Who begs a brother of the earth
To give him leave to toil!
And see his lordly fellow worm
The poor petition spurn,
Unmindful tho' a weeping wife
And helpless offspring mourn."

This is a sad picture, one that we do not like to contemplate, yet it is a possible one for the wage earner. But a darker one was drawn by Edward Markham, in his "Muse of Laborer."

"The toilers go on; broken at the heart
They send a spell of beauty on all the lands
But of what avail? The builders have no part
No share in all the glory of their hands."

They build palaces where refinement, luxury and ease exist, while they are sheltered in a hovel. While they may with their own hands weave the cloth that is to clothe the rich in splendor, yet the same laborers are clothed in rags. While they have done all and are doing all that

has wrought this beauty upon the land, yet they enjoy none of its fruitage.

These are dark pictures and are not necessarily accompaniments of wage earning, yet they are possible pictures.

But there are some other vocations or pursuits that have none of these possibilities of darkness or sadness. Let us take agriculture and see what there is in that. There are labor and hardships there—I know of what I speak—but I think I know whereof I speak also when I say that the hardships there are not comparable to those of some other vocations of life. Take the same thought given by Edward Markham, that those who do those things that mark the great progress all over this land, do not enjoy any of it. The farmer produces those things that grow upon his farm. He has the first ripe fruitage of his farm. Does he not? I gladly quote some statements made by the former speaker, in describing the country home and contrasting, as I believe she did, the fare spread upon the table of the average country home, or even, if you please, the poorest country home, with the medium city home of the wage earner. I have been in the homes of hundreds of wage earners, and I want to tell you that live upon farms—none of the other class are here to-day—those of you who live in competency and have such things upon your tables as you desire to eat have no sort of conception of the squalid poverty that oftentimes goes along with those who live in cities. You do not understand it. Go to the homes of the country people of the poorest class and let us see what the contrast is. You can go to the poorest family in the country, of any account at all—I know there are some that are worthless and negligent, but I am speaking of those who are striving to be something—I do not care how poor they are, they have on their tables what would be called among the poor of the city, a splendid repast. Don't they? Let me tell you, upon a certain occasion a few years ago it so happened that for about a week prior to a trip I was going to take, I had gone to several what they term in the country "turkey dinners," and I dare say all of you know what that means. How the table groans with richness and with the finest and best of the farm products! You know just what kind of dinners we had, without describing them. This was a farmer's house—not rich—but a common farmer of my county. I then went to the city, and in that large city there was a splendid banquet. They had a magnificent spread on the table. But

when you took an inventory of the repast, all that there was on that banquet table that was worth eating was also on the country table, but in better shape. It was there all right. Take away from the banquets on the city tables all the common things of the farm, take away the glorious turkey, the yellow-legged chicken, the product of poultry and eggs and the crumpled horned cow and there will be a pretty small banquet. Will there not? And there is not a farm home in all this country but that may have, with anything like half an effort, be they poor renters or what not, all these things in abundance. They do have them. Turkeys will grow wild out here and get fat even on grasshoppers and we can have them in the country. Remember now that this eighty-six per cent of farmers' sons that have gone from the farms to the cities in New England, and perhaps fifty per cent in the western states, have gone into the avenues of labor; some I dare say into the darkness of the miner's pit and some under the oppressions of the task master. Those places are practically filled to-day, while the farmer's life affords opportunity for livelihood vastly superior (I say with earnestness) to that of any other profession. I grant you if a young man could be sure of reaching the high pinnacle to which he aspires, it would be all right to choose another profession; but to make sure of an average success, I believe that the proper profession to choose is that of agriculture. I believe it and I believe it is enough to say I do not think the picture has been over-drawn.

There are two reasons for presenting these things—two reasons for making this discussion. One is this, I believe it would be good advice for you to give your sons and daughters and relatives: "Before you enter another occupation, be careful to see if you had not better stay on the farm;" and secondly in consideration of these conditions, that exist now, in consideration of the fact that the business in which you as farmers are engaged is the equal of any other business and better than many of them, it will possibly cause us to be better reconciled to our farms. During the last twenty-five year period (I think I speak advisedly when I say it), there never was a period in the history of this or any other country in which such a large percentage of the farmers were dissatisfied with their business; and I believe I voice the sentiment in the breasts of all of you when I say the time was when you wished you were in another business and you were dissatisfied; but you were in the

proper business all the time. I believe a consideration of these things will reconcile you to your business, and give you a greater degree of happiness; for the greatest degree of unhappiness that can possibly come to you or me is to be dissatisfied with our business. And it will be helpful in your business. Being fully reconciled to our business, and having implicit faith in it, we will turn our attention to the best possible method of cultivating it.

I will venture to say to-day that the greatest bar to agriculture that has been among these people is that they have not had implicit confidence in their business and consequently not had that love for their business that they ought to have and have not turned their attention so minutely and thoroughly to the best method of carrying out their business as they should have done. If this discussion shall have the effect of causing any one of you to be better satisfied with your business than you were before, the purpose of this talk will be fulfilled. I thank you for your attention.

Mr. Raine—I am sorry to state that neither Gov. Colman nor Brother Jones have arrived. In their absence I am going to substitute. We have with us a gentleman who is not a public speaker but one of the true and tried members of the order and always does his duty, and I am going to call upon him now for a few remarks, the lecturer of the Missouri State Grange, Judge Long of Lewis county.

Judge Long—Ladies and gentlemen, I am truly sorry that the brothers whose names are on the program are not here to-day. For me to undertake to make an address after having listened to the two that have preceded me and try to entertain these people it seems to me is out of the ordinary. Brother Waters was telling us how to select a profession, and I think from the drift of his remarks he landed you on the farm. Now, ladies and gentlemen, when we get there, as he told you, there is labor ahead. No man ever made a success on the farm without great and constant labor.

The idea that seems to be prevalent among people generally is that anybody can farm. Any of us that have farmed can tell you this is not true. A man may follow a plow, he may drive a team, but is he a successful farmer unless he makes that plowing a success? Certainly he is not.

It is necessary, I take it, after we enter that business, to prepare to .

protect ourselves, in other words, to organize in such manner that we can get the greatest good for the labor that we perform. Now all of you are thinking, he is going to bring you into the Grange. Ladies and gentlemen, there is just where I want you and in order to be a successful granger it is necessary for you to make some degree of success on the farm. If you will come and join the Grange, study its principles and then apply them, I think you will get along better.

There is such a thing as a man thinking he knows it all. I never heard a discussion that I did not get something out of it, and there are few men that could not get something out of what is said by others. We may think our ideas are better than yours, but that certainly is a question you alone can decide, but some good must develop from an interchange of ideas. If we will study and read up on any part of our business, do you not think from the nature of things, we are better able to take hold and manage that part? When a man embarks in the mercantile pursuit, is it not a fact that the closer he attends to his business, the more study he gives it, especially the minute details, the nearer he comes to success? A man that can go on a farm practically without anything, and eventually, as the brother says, after the close of a well rounded life have things that surround him and make his life comfortable and happy, I call that a success. But if he goes on a farm and ekes out a bare existence there is no comfort there for himself, his family or his friends. One of the ways to accomplish success is to gather all the information possible upon the business in which you are engaged and follow it through, and it seems to me, barring ill health, accidents or something of that kind, there is very little chance for a failure. We have all known men who failed on the farm, yet it has been clearly shown to you that men have failed in every vocation of life. We have known men who studied for the ministry and according to our views made a failure in that line, men who entered the law and were not a success there, men who have failed in the medical profession, and it seems you can say more men succeed on the farm than in any other occupation.

It has been told that the farmer breathes the pure air and all that. It sounds nice and is true, every bit of it, but there are times when you would like to take a change of air once in a while. The city people enjoy our air, but if they had to work on the farm all the time, that would be a different thing. When a man's health fails, where does he

go to gain strength? If he is a moneyed man, he goes to some spring. But the majority of people in feeble health think: "If I can get out in some quiet place and board at some farm house and fish and hunt a little, I will get better and soon be ready for business." If the country air is good for the invalid, why is it not beneficial to the stout and stalwart man among us? If there is anyone who can enjoy life, it is the man who is physically sound and has a reasonable degree of mental strength and all those things that make life pleasant. If country life is required to make life enjoyable, we ought to be perfectly happy on our farms.

They tell me that Howard used to be a strong grange county, that there used to be a number of granges here, but they stranded on that rock of co-operative stores. I think the stores located by the grange people in all the counties failed. Possibly it was from a lack of understanding the business, possibly they were not sufficiently attentive to that department to make it a success. It might have been a lack of management or support. Possibly we endeavored to sell the products to the people at too small a profit. Every man knows that which you get for nothing is not very good and is usually the dearest product you receive. If you want anything you must pay for it. If you have a man to attend to your business who is worth the money, pay him for it. If you are going to run a co-operative store, pay a man qualified to do the work, that you may get services worth something. The co-operative store was the rock that stranded the grange in our county. I was in favor of this co-operative plan so far as the granger and farmer is concerned. It is a good thing, but must be managed on business principles, and that one thing we advocate in the grange as strongly as anything.

Another feature of the grange is the social feature, and those who have attended the grange can not fail to see the great benefit derived therefrom. That is a place where we meet on an equal footing, a place where politics and religion do not enter into our discussions, a place where one man has just as good a chance as another to study any question that comes up without fear of disturbing the feelings of others. I think that is an advantage. There is another, it is a place where a man can take his wife and daughter and she too has an opportunity to discuss the question in which she is interested. She is admitted on an equal

standard and participates in many instances in the discussion of questions that to her are interesting and necessary to the man.

The lady who spoke of the cooking school dwelt on the glories of the dinner in the country, and I was satisfied that somebody had attended to that turkey at home before a cooking school was started. I am glad we had the pleasure of hearing her address and trust we listened to the suggestions offered and feel an interest in the cooking schools and will remember these instructions and take them home with us.

I am sorry I can not entertain you further. I thank you for your kind attention.

Mr. Raine—Now then, ladies and gentlemen, this closes the program that we have arranged. We ask you to proceed to discuss any of these subjects this afternoon if any so desire. We might spend a few minutes in that manner if you see fit. All present are cordially invited to enter into this discussion.

Mr. Shores—I do not know why I was called for, unless it is because the people of Howard county have heaped upon me honor after honor that I have not been worthy of. For quite a number of years I was master of the county grange and for four years overseer of the State Grange. I attended every meeting of the State Grange for nine years in succession. That was long ago, but this discussion we have been listening to this afternoon has aroused a deep sympathy and a warm, heart-felt feeling in my breast for old times, especially the remarks of Brother Long, talking about the inside work of the grange. He has not forgotten it. I wish to recall a few things this afternoon to those in this county who have been true and faithful members of this organization. If you do not think we belong to the organization, give us a chance to get you by the hand and we will convince you we are. We know just how to take hold. I will tell you more than that. We know how to make those distinct raps you know so well about. I would have had no trouble in getting into the gate if it was not for the pass word. You know I went to the outside door and made those familiar raps and some good brother put his ear to my lips to come close, and I could have made it all right there; but I simply said: "Is it a secret session." He said: "It is," and I said, "I can not go much further."

While at Sedalia the last of February, I met a man I expected to see here to-day. His face was familiar, and he said to me, "How about

organizing Howard county?" I said to him: "Brother Harbaugh, nothing would give me greater pleasure. We once had forty-two subordinate granges and four co-operative stores in Howard county. You come to Fayette and we will be there and see what we can do." Where is Brother Harbaugh to-day? He has not been at this session. Back yonder twenty years ago he was at every session. He is what we call a grange crank. I am one of them too. We had one co-operative store that saved us thousands of dollars. Brother Richmond brought about that splendid success.

Another thing that draws me to this organization is these ladies. I remember at a special we held in Jefferson City that I was overseer at that time and was a day late on account of the train and I looked about and found we had a hundred delegates, eighty or a hundred county representatives and I saw something I shall never forget. I looked at the pomoma's chair and it was in mourning. My wife had died that year and they had left her seat vacant until I could get there and this was the consolation that came through these brethren and sisters. I will never forget it. This is a dear organization to me.

When old brothers Eshbaugh and Allen were masters the Grange was in its pride. Do you younger members know Missouri stood second in the Union in grange work then, and Iowa alone at that time was ahead of Missouri in the great United States? Do you know Missouri had a hundred thousand members at that time? Most assuredly. Why is it not so to-day? I can only say somehow farmers do not stick to the organization. After this order that we call the Patrons of Husbandry and some people call the Grange—(it is the same of course)—died out, we farmers were not satisfied and we had a Farmers' Alliance and we worked it for all there was in it. We got nothing out of it except Farmers' Mutual Insurance companies and we have in that just now nearly a million dollars worth of property insured in this county and a thousand policy holders. It has been a success so far. I trust it ever will be. If you can tell us how to get in good shape as we once were, how quickly we will fly into line. We are down just now, but we have the same grange spirit and if you can assist us in getting this organization in as good shape as it once was, how glad we will be. We would be so glad if the leading farmers of Howard and other counties would reorganize. I have heard many farmers say, we would be so glad if the

grange could be reorganized and our daughters and sons and sisters and brothers get together and talk in the school house, but we do not believe it can be done. Judge Woods of the county court said to me recently: "Did Col. Waters call on you to consult about the grange?" I said, "No." He said, "He called on me and I gave him your name with others. Do you think it can be made a success?" I told him what I told Col. Waters. We are all sorry, but we believe that as things are now it would be almost an impossibility. But we bid you God speed in this great and noble work.

Mr. Long spoke about the intellectual, moral, social and financial features of the grange. Let me tell you, when we organized at our school house, there was not a man in that district who could make anything like an intelligent talk. Don't you know the boys got up in the grange and talked and orators sprang up at these schools and they got so they expressed themselves in intelligent language, and they went from there to the county grange; and in the county grange they discussed matters and went from there to the State and district grange and introduced resolutions that had something of the right ring in them. It is a matter of education.

Talk about the social features, no politics, no religion, all coming together on an equal footing and discussing things of interest to the farmers, not trying to learn another vocation, but trying to elevate ourselves in our own calling. We have been away down there and we want to help ourselves up and get where white people live. The merchants have sliced our profits both ways. We need to be educated for we are the losers while they are going on to success and we realize it.

Mr. Raine—We will now ask Col. Waters, whom we have drawn from the error of his way and made a patron. I expected when I met him with a delegation coming on the train to find him with the proper regalia on, instead he had everything with a road badge, and some of them we have not been able to get off yet. We intended to place the badge upon the brother upon this occasion, we intended to mark Col. Waters, but we have overlooked that. He has been working in the interest of the grange for the past month and we ask him to respond.

Col. Waters—The worthy master speaks about turning me from the error of my ways. I was a granger a long time ago. I was a member of one of the first granges in North Missouri. It existed in Lewis

county. I have been in the habit of going to the grange of Lewis county, perhaps not as often as I should.

During the last month, I went in the interest of the grange to Judge White, as suggested, and to others. I went quite a distance in the country and the uniform reply was: "We desire to have the grange reorganized," but—that fatal conjunction—"but we do not believe it can be done." We thought the annual meeting of the State Grange would be the time to approach the people and we deferred further effort in organizing granges in Howard county until after this meeting. We have been in other counties like this—no better—no worse. The same objection was raised there. After talking the matter over, going from house to house, all conceding that the grange was a grand and noble order and all expressing a desire that it should be organized, we set a time for meeting, after having consulted a number of old grangers. They came together and there was enough of the old leven, we will call it,—enough of the old members there in every instance to beget something of enthusiasm. They are reorganizing, my brethren, and it is only a question of time, if the proper effort is made, when the grange will be reorganized in the State of Missouri. I fully believe it. I have been in a number of counties, and consulted a great number of these people, and after they have talked this matter over carefully and we have taken in our hands our declaration of purposes and carefully reviewed all the grand history of the grange organization we have no doubt there will be begotten the enthusiasm that has been begotten in every instance and they will reorganize. We will reorganize, I hope, and I thoroughly believe, my brother, in Howard county, and that is the reason why we left our work and seemingly gave it up. It was in view of the fact that this meeting was to be held here, believing we could reach the work more directly after this meeting than before. Now we hope that the suggestions that have been made will radiate and reach out and take hold of the hearts of these people, so that when the master of the State Grange approaches you, as he expects to do in the near future, you will give him that hearty response which I believe you will.

Mr. Baskett—Mr. Chairman, it is very embarrassing for me to attempt to say anything at any time, especially before such an audience as this, but I heartily indorse what Mr. Shores has said. I have been a member of the county lodge and enjoyed its meetings and it seems to me

that we farmers ought not to be so far behind other counties that we should not organize. I was glad when we found we would meet in Fayette.

Mr. Sheppard—Mr. Chairman, I do not know whether I can make any sort of speech or not. I have not given the thing one thought, with the expectation of standing up before this intelligent audience. I belong to the grange and hung to it as long as there was anything in it. I never left it. I was very much in favor of the co-operative move. I took stock in a grange store. My stock went down, yet I did not cry over it, for I believed I did right, because I was trying to help myself and my family, and I knew when I helped these I helped every man in the county, and in the State, as to that.

I have heard this expression often, that the boy is father to the man, the girl mother to the woman. Howard county is the mother of counties, but I think the boy and girl have gotten ahead of us—I refer to these gentlemen who have been speaking to us and these good looking ladies—they have gotten so far ahead of us that they have become our fathers and mothers, and we ought to be ashamed of ourselves, allowing these people to try to teach us when we are the mothers and fathers of them—we sent them out from here. We used to go into Lewis county deer hunting and we did not think it was worth settling there. My father came from old Virginia and he said to me: "My son do not go to Kansas," and now Kansas is ahead of us, and this country over there, you have made it bloom as a rose. I was all over that country during the war. I was a thorough Union man. I am again willing to take up the grange and do anything we can do. I am yet willing to try to organize if it is possible to be done. I had thought, worthy master, that that was a thing of the past, and could not be done. But we do not know what we can do till we try and I am willing to help.

Mr. Hariston—I do not care to make any talk. I will just say this, that it seems to me if there is a class of people on earth that ought to be organized and keep organized, it is the agricultural class of this country. Every other class of any importance is organized and agriculture, being the source of all wealth in this country, has less to do and less to say about the prices of the products it produces than any other organization. And I see no reason for this, because the agricultural people of this county are as intelligent a class of people as any in this

country—I see no reason why they should not organize and stay organized and be benefited thereby.

When I was a boy I had a great admiration for the grange. Of course the secret feature was a mystery to me. But when I recognized that the best men of this country were in that organization and working harmoniously together, and knew something of its educational feature and the benefits derived therefrom, it made me anxious to become a member of something of that kind and I was one of the first members of the Alliance and took an active part in it, going night and day to its meetings and I took great pleasure in it. We have seen many good results from the Alliance, but it got into politics and the fall came. Of course we were sorry when it collapsed. I as one simple citizen of this county am willing to do what I can to get up a grange organization in this county. I would like to be a member and meet and discuss with the farmers, plans by which we can develop our agricultural interests.

I was glad to hear Brother Shores talk something along this line because I knew he was one of the first grangers in this county. I remember another man whom the state knew and honored well, Hon. John Walker, a man whom I knew to be an admirable granger and a good member. I see no reason why we should not have a number of granges in this county. We may not reach that pinnacle of success we once had, but we can reach a success and be benefited by it.

Mr. Walker—I was a granger for a number of years but do not wish to make any speech.

Mr. Raine—I want to say to the people of Howard county who have so pleasantly entertained us in the last few minutes, if you had only brought your wives and daughters and sons we would have a grange in Howard county before the sun goes down.

You all belonged to the Alliance. The Alliance though a good institution fortunately for the eastern people, never got across the State of Illinois before it went to pieces, consequently the people east of Illinois have not had the failure of that organization to battle with. We have to over-come the prejudices of people in regard to the Alliance, it being the last organization of this kind in this State, before we can do anything with a great many of them. The people are anxious to organize when they see and know that the organization is going to be perfected. I would like to have, instead of forty-two granges in Howard

county and four co-operative stores, ten good, wide awake granges, with not more than two stores. We would rather have ten granges and no stores than forty-two granges again and four co-operative stores before you are prepared for them.

We present first the social feature, which brings a man and his family into social relationship to his neighbors' families, one community coming together as a band of farmers. The word grange means a farmer. Wherever you have a grange organization, there you have a band of farmers, the master and overseer presiding over them represents a home, ruled by a man and his wife.

We place the social feature first, and second the educational feature. When you have developed the educational feature, you then have the financial and the legislative. That comprises, then, I say, the work of the individual from the domestic affairs of life to the head of the national government. We are glad that we still have an order in existence in Missouri and like the Farmers' Alliance, though it went to pieces in the early days of the organization and the work has become almost obsolete in Missouri. It seemed at one time that our order would most certainly be extinguished and in a very short time; but I feel now that if the proper effort is put forth, ere long Missouri will stand, not probably where she once did, because it will require great work, but will occupy an important position among the states. New York has sixty thousand patrons, Ohio, thirty thousand, Michigan has a hundred new granges this year. Think of it! The order is taking on new lines of work. We have a sound financial basis, that is the National Organization has great funds at interest, the principal of which is never used. At the time of the Kansas grasshopper famine fifty thousand dollars was donated by the National Grange to the sufferers of Kansas and there yet remained a great surplus on hand.

Coming down a little further, we are glad to know that the grange was the first to advocate free mail delivery, and this is one of the nicest features of farm life that has been adopted to improve this Union.

Then we have a telephone system. In Lewis county we in a short time will reach all the farms of our county by the telephone system. When Col. Waters gets good roads all over the State and we have free mail delivery—for the prospect is now that it will be a universal matter

—the farmers will have some of the conveniences that before fell only to the lot of the city people.

We are not going to stop this work of organizing. We have taken up the work of developing the grange in Missouri and I feel that the people of Howard county are ready and willing to take up this work. We are conducting it on a different system from the ones we have had before. We are presenting no public petition, but we go privately and get the best citizens of the neighborhood to sign our petition. We do not call a public meeting and let everybody in because we should have in the grange only those whom you would be willing to present to your household. By this means of a private petition we bring in only those who should belong to the grange. We are going to Columbia soon. We have some friends over there. Prof. Waters, Dean of the Agricultural College, who is present with us this afternoon, is there. He was one of the members of the order in Center county, Pennsylvania. Pennsylvania pays annually eleven hundred dollars out to the National Grange, and when you understand that five cents per capita per year is paid as fees from the State you can calculate the number of patrons in the State of Pennsylvania. We are going to Columbia soon and we understand Miss Zabriskie will meet with us. We are going to organize a grange at the Agricultural College.

But we are not going to stop with that. We are going on a little further than that. We have asked Dr. Jesse to meet with us. Dr. Jesse told us at Sedalia: "We want you to organize a grange at the Agricultural College." He made that request and I guess it is wise that he did and he is wise in looking after that.

I want you hog and poultry and sheep breeders to take notice of the privileges that we have by means of our organization. Through the influence of Col. Waters we have been permitted to meet with you people for the past few years. We have been getting copies of the annual report of the State Board of Agriculture. They have sent them to our grange secretaries for distribution among our patrons. Among the books they sent to us there is one little pamphlet I am sure would be a grand thing for every farmer not only in Howard but for every farmer in the State to read. The title is "Missouri Imperial Mistress of States." I think it should be in the library of every farmer in this State.

I tell you, brother farmers, we have not enough confidence in our-

selves. You want to be masters of your profession, that is what you must be in order to be successful.

I hope we can arrange at this meeting to have public meetings of representatives of all the conventions. We have been prevented from hearing a good many of the discussions at your meetings because of our secret work. We have a certain amount of work that we are compelled to do and as our time is limited, we are prevented from hearing all the proceedings of the different conventions. If arrangements could be made for holding a meeting for a day and a night where every organization could be represented, it would be of great benefit to the work.

To-morrow night the Grange has invited the Industrial Associations to meet with us in open session. While this is an open session, it is also a public meeting. The meeting to-morrow night is in one sense a reception offered by the State Grange to the industrial associations and State Board of Agriculture; we hope all will attend.

I want you people of Howard county to come and let us talk over this matter of re-organization and let us become acquainted with each other.

"The effort of Master C. O. Raine to re-organize the dormant granges and organize new ones should meet with the approval of every intelligent farmer of the State. In this day of organized wealth, the only way for the farmer to receive the full fruits of his labor is through organization and co-operation. Through intelligent organization and co-operation we may learn better what to produce and how to produce it, when to sell and how to buy, and be able to demand and receive just recognition in state and national legislation."

Missouri Horse Breeders' Association.

Fayette, Mo., Wednesday December 12.

Reported by Miss Snowdon Willis.

THE HORSE BREEDING INDUSTRY.

By Hon. C. F. Clark, Mexico, Mo.

In reviewing the horse-breeding industry, I believe the last decade has been the most trying and unprofitable to the breeder, in a financial way, that we have had in the century just passed.

The unprecedented, abnormal and inflated condition of the horse industry, that prevailed ten to fifteen years ago, was both dangerous to the breeder and the horse. When we could sell in the open markets, for cash, from $100 to $1000 (as was done a few years ago) ill-shaped, dwarfy and ungainly looking animals, that were unfit to fill any respectable place allotted by a civilized community, and had nothing to recommend them save the fact that we were able to trace their blood lines to some ancestor that had trotted or paced a mile in 2:25 or better; certainly the horse boom ran high, and to the men alone who converted their horse interests into cash came wealth.

The horse business, like all others, has its flood and its ebb tides, and the higher the flood the greater the ebb must necessarily be to correspond. During the decade just passed we have gone through both, and from each we have gathered lessons, which if rightly applied, will place the horse-breeding industry and the horse on a higher plane than ever before reached.

In this country we have a multiplicity of breeds and types of horses, and among the most important are the Thoroughbreds, English Hackneys, Cleveland Bays, French Coach, German Coach, Clydesdales, Percherons, English Draft, Russian Orloffs, American Trotters and Ameri-

can Gaited Saddlers. All but the two last named are foreign breeds and types, but each has distinctive qualities not possessed by any other; so much so that they may be easily recognized by any one familiar with these different breeds and types, and all show careful line breeding for many years. A quality more recklessly neglected by our home breeders than any other one I can imagine. We have no general, well-defined ideas laid down by the promoters of the two great American horse products that will enable even an expert to classify them as he meets them on the public highways; for the reason they are all shapes, colors, styles, and have no uniformity of action or size. The trotting-bred horse may do nothing but saddle and the saddle-bred horse may do nothing but trot. So long as we allow these conditions to exist we will be unable to boast of any very marked degree of advancement in establishing a distinct type for the American Trotting Horse or the American Gaited Horse. I now desire to make a statement with all the emphasis in my power, and respectfully request each man who hears it to consider it well. No breed or type of horses will ever meet the approval of a scrutinizing public until they can be recognized and placed where they belong without the aid of a certificate of registration from some company, association or corporation engaged in that sort of business. All history teaches us that no man or association of men has ever been able to successfully establish a distinct breed of chickens, sheep, hogs, cattle or horses without giving to that distinct breed a distinction not known to any other.

You may imagine from my remarks that I desire to criticise to some extent the American Trotting Register and the National Saddle Horse Association. I do not, only in this; neither represent a well defined type of horse, and they must come to that or fall. Both of these registers are valuable and almost indespensable to the breeders, for they are the only reliable guide-posts he has for his breeding venture, in producing an American horse, and if he disregards them his efforts will fail sooner or later.

A breeder must have a thorough knowledge of the ancestors of his breeding animals before he is capable of mating them in an intelligent way. The old law of breeding, that "like produces like or the likeness of some ancestor," has stood the test for years, and it is the foundation and corner stone upon which every breeder should build. But do not deceive yourselves by thinking that at all times you can depend upon produc-

ing colts of the color, size and markings of the sire and dam, even if they resemble each other very much in those particulars, for it all depends upon how far back the markings run on both sides of the family.

If you can consult the registers and find the maternal and paternal sides of the family extend back alike for a number of crosses, you need not fear any bad results, but if upon consulting the register you find the ancestors unlike, you will be perfectly at sea in your breeding venture and can not figure with any degree of certainty what the product will be.

The horse breeding business does not stand upon sentiment and fancy, and if you expect to build successfully in the business, you must not let fancy and sentiment be your guide, but must take hold of it with all the coolness and skill of a great architect, and know just what kind of a structure you intend to erect before you place a single corner of its foundation. I believe success will be as certain if you heed these suggestions as it is that night follows day, and that your work will become a living monument to your name.

No man should begin the horse-breeding business until he has fixed an ideal horse in his mind's eye, and if he hopes to make the business profitable it should be such a type as the markets of the world will most demand. Possibly it would be well to know what that market is liable to be, for there must be a demand for a product before the business of producing it can be made profitable, and in the way of explanation, I will here say that according to the last report from the Department of Agriculture, we had in the United States on the first day of January, 1900, 13,537,524 horses, valued at $44.51 per head; just $13 more per head than they were in 1897. The same report also tells us that in 1893 we had 16,206,802 horses in the United States, nearly 3,000,000 more than we had the first of last January, and our population had increased about 10,000,000 during that period. From these figures we can readily see that there has been a reduction of the horse stock in the United States per capita, in the last seven years, of more than 25 per cent.

The displacement of the horse by electric power was all done before 1893, and wheels have been growing less in favor every year, so we can not give to either of these two modern inventions any credit of supplanting the use of the horse since that date. This is not all: we now have five times as much demand for our horses from foreign countries as we did seven years ago, and you must also remember we can not breed

and develop horses for the markets as we can hogs, sheep or cattle, and that it takes six years to grow and prepare horses before they can be well placed. From this statement and figures you can readily see that we, of necessity, are bound to have a good market for all our marketable horse products for quite a number of years to come. It is not only important to know that we will have a good market for our horses, but it is important for the Missouri breeders to know the class and kind that are most sought after at renumerative prices. All of our well established classes or types of horses have admirers, and important stations to fill, and it is not my mission to underrate any of them, but I truly believe there is more demand at good and liberal prices for the high class harness horse, of good weight and substance, from our home and foreign markets than there is for all other classes combined. They are in the greatest demand because they are our best American product, and will continue to be, for we have them built upon the safest foundation.

When we use the term "high class harness horse," we do not necessarily mean a horse that can trot in 2:30 or better, and has probably had twice as much money expended on him to educate him to that point as he would bring in the open markets, but we mean a high bred animal with plenty of style, action, finish and substance, from fifteen and three-fourths to sixteen and one-fourth hands high, and will weigh from 1,100 to 1,250 pounds. The very kind of horses that are good and reliable any place you put them, and just such as farmers can raise and develop with less trouble and expense than they can any other class of horses known; for as soon as a colt of this class is three years old, if he has been handled in his weanling, yearling and two-year-old form, he is fit to put in the field and do good work in a crop and will pay well for his feed until he is of marketable age.

The farmers are the natural horse-breeders of Missouri, and I doubt the wisdom of any man undertaking it as a separate and distinct business, but it is a natural adjunct to the farming industry and can be pursued in that way with pleasure and profit.

The education a colt receives on a farm, if in good hands, is the best that can possibly be given him, for he is there taught to walk in a prompt and unswerving way, first with light loads, but later on his burdens are increased so gradually that he does not realize it, and he soon becomes obedient, tractable and trustworthy and can be driven or worked

to the wagon, cultivator, mower, harrow, or corn planter on either side, and to the cart, road wagon and saddle. These lessons are valuable and indespensable to the horse before he is fit for the market, and when they can be given in the way here suggested they are not expensive. If all this work is to be done by men who term themselves trainers, it will be very expensive, necessarily, and nine times out of ten it will not be as well done. In my judgment the only place a horse trainer can be used with profit is in handling and developing the thoroughbred, a class of horses mainly used by sporting men and by progressive breeders (who desire new infusions of blood, where more finish, quality and action are needed) and in putting on the finishing touch in the way of grooming, bitting, mannering and directing the shoeing of our horses, that they may appear in the best possible condition to attract liberal buyers.

I congratulate the horse-breeders of Missouri upon what I consider the most wonderful opportunity ever placed in their reach. The horse is now the idol of all our wealthy society people from New York to San Francisco, and I can say with the same propriety, throughout the civilized world. He never before occupied such an exalted position in the hearts and in the homes of our best citizens.

Society has decreed that every city in the United States, that undertakes to assume a metropolitan air, shall hold from one to four society events annually, called "Horse Shows," which are looked forward to with about as much interest as the inauguration of a President. For the beauties that glide like fairies under the saddle and the aristocratic high-stepping, glossy-coated coachers and roadsters that play the principal part at these entertainments, fabulous prices are paid. I further congratulate the horse-breeders of Missouri upon the special and educational opportunities that will be afforded them in the near future to compare their products with the best in the land at a Missouri State Fair that was established by the last Legislature, and at the Worlds Fair at St. Louis, which I anticipate will be the greatest event of the kind the world has ever known.

Now in conclusion, I will say that the clouds which have hung over the horse-breeding industry for a number of years just passed, have fully disappeared, and the advent of better prices from every direction and for all classes has been coupled with a more favorable consideration and a greater appreciation of man's best friend—the horse.

ENCOURAGEMENT TO THE HORSE INDUSTRY.

By Dr. A. W. McAlester, Columbia, Mo.

Mr President:—I suggested to Mr. Clark as there were only two of us to say anything, that we read the articles together, because we were speaking on the same subject and have to go over somewhat the same ground.

I can hardly deal with this subject without offering some statistics and he and I drew our statistics from the same source. I obtained mine largely through the courtesy of my old friend Col. Rippey and Hon. J. M. Seibert.

We make a pause upon one or two little points on the horse industry as it applies to the State of Missouri, and in this I have tried to exclude the idea of simply one type of horse and made it applicable, as far as I can to the class of horses that all farmers have. I submit a few thoughts on the value of the horse industry. If it is the province of the State to encourage and protect her industries, then all industries should share alike in this protection and encouragement.

I submit the following statement furnished me by the State Auditor, showing the number and assessed value of the live stock in Missouri as shown by the assessors June 1, 1899:

June 1, 1899 for taxes of 1900.	Number.	Value.
Horses	831,580	$17,402,914
Mules	219,716	5,294,873
Asses and Jennets	6,939	277,876
Neat Cattle	2,026,905	28,589,555
Sheep	643,599	929,014
Hogs	2,396,449	4,316,463
All other live stock	.....	42,212

You will see by these statistics that the value of the horse industry comes next to the cattle industry.

The number of horses in the United States in 1893 was 16,206,802,

valued at $61.22 each, or a total value of the horse industry of near one billion dollars. For 1899 statistics from the same source place the number of horses at 13,665,307, or a decrease in number of 2,541,495 head, with a valuation of $37.39 each, against $61.22 for 1893, or a decline in the value of the horse stock of this country of $481,000,000.

While this decline in price of horses and decrease in number has been taking place, the population of the United States has increased about 23 per cent. In other words, in 1893 there was one horse for every 3.7 of our population, while in 1899 there was one horse for every 5.5 of our population. The per capita value of the horse stock in the United States in 1893 was $16.50, while in 1899 it was $6.60.

In this State in 1893 there was returned for assessment 1,240,963 horses against 1,058,235 for 1899, a loss of 182,708 head. The average assessed value of each in 1893 was $34.37, while in 1899 it was $21.70, or a decline of $12.67 per head. The total assessed value in 1893 was $42,433,862, but in 1899 it was only $22,925,663, a loss of nearly $20,000,000.

But this decline in prices has opened a market for American horses all over the world. Our mules (and we say it with humiliation, my good friend Col. Rippey adds) have contributed to British success in the Transvaal and are now going to the Philippines to uphold the flag and sustain the policy of expansion. The English government has now begun to carry on an experiment to see where she is to get the horse flesh that is to subserve her interest in the Transvaal. The facts are that English horses die there so quickly that it hardly pays to ship them. They die from the climate and from a Teste fly they have there. The horses fall down and the English have to go to the very great expense of employing men where horses should be employed, because the fly kills the horses. They have now begun to try to produce a breed that will stand the fly. Whether they will succeed or not is another question. They have taken the zebra and bred it with the smaller mares that belong to the English and it is simply an experiment whether these small horses that have been bred by crossing the mare with the zebra will stand the test. It shows the extremity that a government is placed in when she undertakes to fill the wants of her people. If they are willing to undergo this immense amount of expense, as this experiment is excessively expensive, it is well enough to consider what we can do in the way of supplying our share of that market.

We want some horses in the Philippines as they have to uphold our flag and sustain our policy of expansion. Our horses are in demand for cavalry purposes in Europe. Our roadsters and better class of horses have found profitable prices in Austria, Germany and elsewhere. There is actually a large shipment to be made next summer of trotting horses to be kept throughout all the foreign nations. A man whose name I can not recollect, made up his mind about a week ago to buy the best horses and campaign England, Germany, France and Russia to make an exhibition of the American trotting horse. Large shipments have been made for industrial purposes to Australia, South Africa, Hawaii and to all European ports. This foreign demand will continue if we breed horses that will answer the requirements. We can produce them at a profit for less than can the densely populated European centers. The cost of the horse there has almost prohibited their use. You can scarcely feed a horse at one of these densely populated places for less than seventy-five cents to a dollar a day and they can not raise a horse to compete with ours. If our horses meet their demands they will discontinue breeding and our prices will advance. But the horse must be bred for a special purpose. There is not now and probably will not be in the future a demand for nondescripts or scrubs.

I hold in my possession a letter from a friend of mine by the name of Reynolds who had a ranch on which were three thousand head of horses. I wrote to him one day this week and got his answer just as I started up here. He has reduced that herd from three thousand to three hundred and leased out the three hundred horses to labor and sold his three thousand five hundred acres for a cattle trade. He says that he sold the big geldings for $22, out of that herd, and that he offered all the producing stock for a little over seven dollars and a little less than eight dollars per head. You may think they were all Texas ponies and mustangs, but they were not of that description. I know that from the fact that just before the Inter-State War a gentleman from Tennessee brought the start of that herd from Tennessee horses, bringing fifty head. That was in 1854. Mr. Reynolds brought these horses out at the close of the war (1865) and having known him for a number of years, I know he would pay from five hundred to two thousand dollars a head for his stallions that he would turn on his ranch. I got well acquainted with him and sold him a stallion for $1,250. He has been putting

money on his ranch, but now he throws the whole thing up because he says there is no demand for ranch horses.

While horses are comparatively low, supply yourselves with the very best brood mares in the line of breeding which you wish to follow. I think that if there is any point that will administer to the horse-breeding industry it is that a man must follow a line of breeding if he wishes to make a success. If you want a pure bred dog, you will certainly breed pure breeds and not mix them with another breed. So it is with horses. If you want a certain kind of horse you must breed in that line and if possible, in its purity. You must have the foundation right or satisfactory results will not follow. Too much care can not be exercised in the selection of a stallion.

One point regarding what has been done in reference to the thoroughbred horse in the United States. There are only five thousand thoroughbred horses in the United States. They have formed what is termed the Breeders' Protective Association, in which if they find a mare has failed to produce a successful race horse she is bought by this Breeders' Association and is marked out in the stud book and she is shipped anywhere that anybody will buy her and sold without a pedigree. This is for the purpose of eliminating the nonproducing element out of that branch of breeding. This breeders' association was conceived and carried on by Messrs. Belmont, Lorillard and Whitney besides a host of others. I mention these because they are familiar to almost every person. It had its origin in Lexington, Kentucky. These men have gone into it and put a certain amount of money in it and wherever such a mare is put up, she is bought by this association and sold without pedigree. This is a move to eliminate the non-producer. You might ask, without giving this matter a moment's thought, how will this ever succeed. A set of fellows will say, I will make a thoroughbred. No man or set of men can ever make a thoroughbred for no man lives long enough to make a thoroughbred. You have got to live for a hundred years, so it is practically impossible, and to-day there is not a horse regarded respectable among the thoroughbreds unless you can trace his unbroken lineage and show a million of known ancestors. That is considered respectable and that simply shows it is impossible to make a thoroughbred. You have to take him as he exists. There are only ten thousand brood mares in the world. They have all sprung from twenty mares, the original tap roots.

If the stallion is strictly bred in his line, he will impress his size, color, action and vitality upon his progeny. If you know what kind of a horse you wish to produce and will breed judiciously and take proper care of the foal, he will not miss your expectations far.

I am almost sorry that the road men had their informal meeting quite so soon, because I do not know that I indorse anything that is said on the road question, but the day is coming when people talk about their horseless carriages and bicycles. I have no war to make on them. If a man wants a horseless carriage, let him have it and if he wants a bicycle let him have the best he can get, but we ought not to be deceived with the cry "What is to become of the horse?" At some day in the distant future the people may be fooled into building great boulevards across this country under the deceitful claim of cheaply transporting the people's products, but designed expressly for the use of and to increase the demand for automobiles and bicycles. You may improve your highways to your shipping station, to your church and school house, but you will have to do it yourself and move your farm products with your horses and mules. Nobody will build boulevards for the farmer, and he is unable to do so himself. No one will level the hills on his farm nor fill the valleys, that steam or electricity may be used in the cultivation of his crops. No electrical device will take the place of the saddler in handling his herds, or for rapid transit from one part of his farm to another. The family carriage horse and the farm team will not be displaced by the automibile to carry the farmer's wife and her poultry and garden products to market, nor the products of his farm or orchard or feed pens, to the shipping station. No cavalry corps will cross mountains, ford streams or force its way through dense forests in endeavor to cut off the retreat of the enemy, or prevent re-enforcements or the delivery of supplies, on a machine that can be successfully operated, if at all, only on asphalt boulevards and permanent highways. God created the horse and assigned him to service. Man invented the automobile and capital is endeavoring to make a place for it. The horse will exist in all his grandeur and beauty, when automobiles are stored in ditches and along roadways, unserviceable, unsightly, a cause of derision to the farmer and one of pain and mortification to the manufacturer.

One word more and I close. The thoroughbred horse is like all others in the respect that he has to be placed on exhibition if he is to

be seen, if he is to be utilized. I sometimes rebel against the fact that a horse has to be exhibited, that he has to be trained simply as a test. For instance I might say I have the best horse in the whole country that stands in my stable, and Mr. Clark says he has the best horse. Neither assertion proves anything; the only way to know which horse is the best is to bring them up and try them, let them come together, then do as the breeders' association is doing with these brood mares, wipe the indifferent ones off of the face of the earth. Failure to select the best always causes your stock to go down and never builds them up. Nothing can rise above its source. If you breed to an indifferent horse, your colt will be indifferent and a poor sire can not have good produce. It is just like the school question, if I can make my idea clearer. If you obtain your teachers from the common school, it will be brought up to no higher standard. You must get your teacher from the high school if you wish to bring up the standard of your school. The common school will not rise above itself if that is the source from which you derive your teachers, so you are driven to the high school for teachers. The same principle applies in the horse-breeding question, the horse must go to the high school in order to get improvement and that high school is where you bring him out and try to use what is in him, otherwise he must fall back.

I am sorry I have trespassed so long upon your time. I did not intend to say so much, but as Mr. Clark says "it is a fascinating subject." The doctors here can testify that the business man who does not take into consideration the question of recreation shortens his life because of the drudgery to which he confines himself. There is nothing that will so readily relieve his thoughts from the cares of business as to get a horse that will carry himself and his family around with safety.

Institute Meeting of Missouri State Poultry Association.

WEDNESDAY NIGHT, December 12, 1900.

Reported by Miss Snowdon Willis.

House called to order by President E. E. Codding.

Prayer by Rev. Clay.

Mr. Codding—Ladies and gentlemen, this is our regular institute meeting of the Poultry Association, which is held annually. I have only a few words to say in opening this meeting, as we have other people here who will read papers and make speeches, telling you a great deal more than I can about the poultry industry of Missouri. The poultry industry is one of the largest in the State and we are all proud to be members of this association. I wish to thank the people of Fayette for their kind assistance and liberal attendance, for I must say that they have been very liberal in the past few days and we will have more to be thankful for before we leave.

SUCCESSFUL MANAGEMENT OF THE BRONZE TURKEY.

By Mrs. S. A. McClellan, Granger, Mo.

Mr. President and Members of the Missouri State Poultry Association:

In presenting this paper on the "Successful Management of the Bronze Turkey" at the Ninth Annual Meeting of our association, which is noted for its large and magnificent exhibit in bronze turkeys, I

Note.—A full report of the meeting containing premium list was published in pamphlet form.

think we can proudly say that Missouri has more and better turkeys than any State in the Union.

Watch the show records and where do you find the most turkeys? Why! at the Missouri State Poultry Exhibit. It is a difficult task to benefit the members of the association as to the successful management of the Bronze turkey. Each farm is so differently situated, and each individual has various conveniences at their command and not all could successfully manage them as I do. Yet I will endeavor to give you a few hints and each can take what they can use. The most important thing is to have brains to know what we *can* use. Then use care and judgment in selecting the breeding stock. Don't think weight the criterion of excellence and leave all other important points in the shade. You should pay quite as much attention to the symmetry and the beauty of its plumage as to its size and weight. Select those with a long body, deepest at the center, with full breast, broad back, stout thighs and shanks of moderate length.

Then do not have them fat at breeding time; feed bran and cooked oats with but little corn, give them plenty of range if possible, and if not possible they are most likely to take it any way.

If they are too fat their eggs will be few in number, uneven in size, not so well shelled, and a much smaller percent will prove fertile.

No one should attempt to raise turkeys who has not sufficient space for them, for it is useless to try to raise turkeys on limited runs. This is where many poultry breeders make mistakes and when failure meets them, they lay it down to every cause except the right one. It must be remembered that the turkey is really the last of our domestic fowls that has been brought from its wild state under domestication.

You must not be afraid of work if you expect to be successful in rearing turkeys. It takes work, patience and perseverance—then more work. But turkeys will pay you well for your trouble and when six weeks old most of the work and danger is over and you will be proud of them for they are things of beauty and a joy while they last.

The exact degree of restraint to be placed on turkeys at laying time requires for its solution the nicest sort of judgment. It takes a considerable amount of exercise to keep up with a large flock of turkeys, when they have the whole surface of the broad earth to range over, and if entirely left to themselves, the most secluded spot at the farthest

limit of their range will probably be selected as a nesting place and where crows and varmints will get the most of their eggs. And unless one expects to almost stay out with them, a better plan is to fence an orchard of one or two acres with poultry wire five or six feet high.

In this orchard make a number of nice nests scattered about in the most secluded places. Turn the turkeys in this yard every day for a few hours, for two or three weeks before they begin laying, then at laying time the hens will readily accept the nests.

Do not use barrels for nests, they are too narrow. A turkey can scarcely turn around in them and is liable to break her eggs in getting out. A large box with one side taken off so the nest will be on the ground makes a nice nest and a good place to set her when she is ready to set. Should two or more hens lay in the same nest you can easily move one to a new nest. Let them stay on two or three nights until they are real anxious to set, then after dark move to a nest previously prepared with eggs in it, fasten her up so she can not come out in the morning, let her stay two days, take her out, feed and water and watch to see if she goes back. If inclined to go to the old nest, drive her near the new one, keep her fastened in until she readily takes to her nest. Then you can leave open, providing there is nothing to disturb her.

And don't forget to sprinkle with good *strong* insect powder at least twice during incubation. In setting the hens do not give them too many eggs, fifteen is plenty; if you have more eggs set them under chicken hens and give the little poults to the turkey hen. But they take more time and care when you put many little ones with each hen. When I first began raising turkeys I set forty-eight eggs, hatched forty-two turkeys and put them all with one hen. Now I set one hen on fifteen eggs and usually let her take just what she hatches; there may be one or two unfertile, some may get broken and some are liable to get tramped, so she generally gets out with ten or twelve, which number she can hover and keep dry and warm in any rain, providing she is not in a low place where the water runs under her.

You see with me laziness is the mother of inventions. I don't want to run after them every time a little shower comes up. Study your hens at hatching time, there is as much difference in turkeys as there is in people, some hens will fight and tramp around killing the

little ones if you disturb them or try to remove the little poults, when she will be perfectly quiet if you let her alone; other hens get restless when the little ones begin to pip and sometimes it is best to remove even the pipped eggs to keep them from tramping them out. In this we must just use our best judgment.

Have a pen ready to remove her to when she is ready to leave the nest. Select a spot with green short grass and high ground that naturally drains itself. The pen should be made of twelve inch boards in size 8 to 10 x 12 to 16. In one end have a large box or coop made of boards, in size about three to four feet square, open on the east side and have a window or screen door to fit in so they can be fastened in and yet get light and sunshine. In this coop, for which I prefer a ground floor, place a little straw, remove and put in fresh straw every few days. If a board floor the straw is still essential, as the little ones with weak legs, should not be allowed to walk on boards or anything smooth.

In making the pen be sure there are no holes at the bottom of the boards that a little turkey can get out at or they will wander away and die. Take a spade and throw dirt up on the outside at every place where the boards do not fit close to the ground.

They must have no feed at all until the second day; then feed light bread soaked in sweet milk and feed five times a day. Water in fountains; if you have none, make one by taking an old tin can, drive a nail through one side near the top (a few trials will teach you exactly where to make the hole), fill the can with water and turn upside down in a saucer. The little turkeys must not get wet. The hen can scarcely drink from a saucer, just set in another can filled for her.

When the poults are four or five days old, turn out for an hour or two in the afternoon, providing the weather is suitable and watch to see if the hen does not rove too far with them. Do not turn out when the grass is wet, as long as the foot board will keep them in. When two weeks old begin to feed curd and corn bread soaked in sweet milk and if they have range, three feeds a day will now do them. And when large enough to roam over the meadows, two feeds are all they need, and then begin to mix wheat in with the soaked bread, later mix in corn, they wont eat the grain at first, but the old hens will pick it up after the little ones are through eating and they learn to eat it if you keep putting it before them.

Never allow your turkeys to roost away from the house. If they don't come, go after them, and usually they will soon come of their own accord. And when near home they will raise their little wings and fly to their feeding ground for they are as glad to get home as children let loose from school and bring with them quite as good appetites.

After they are a few weeks old, do not put them up at nights unless the weather is rainy, simply drive them near and every night know just where they are sitting, so that should a hard rain or storm come up in the night, you can go out and get them in.

Never try to raise turkeys with chicken hens, and keep them away from other fowls on the place.

Then do not neglect to watch for lice, as they will soon kill little turkeys; sprinkle often with good strong insect powder. And at all times give them free access to crushed oyster shells.

And now as I have given you one method of successfully managing the Bronze Turkey, there is another mode, which during holidays is the superlative of all others; and few require any instructions to manage the Bronze turkey on Thanksgiving or Christmas, when, baked to a delicious brown and accompanied with cranberry sauce, it appears on the table, a dish fit for a king and relished by the most fastidious epicure.

THE WHITE HOLLAND TURKEY.

By Miss Mary L. Schaal, Lexington, Mo.

Little has been said in the past about the White Holland turkey; but now quite an interest is growing up among our poultry fanciers and the outlook for them, and they are coming to the front at a rapid pace. It is true, they were a long time coming.

But an old proverb says, "Time works wonders" and it surely did with the White Holland turkey for, from little delicate looking things, they have been improved until now we have a turkey that is a credit to anyone's barn yard and as a matter of course we will let the good work continue.

The White Holland turkey is of a docile nature, has not that roving disposition we find in some breeds of turkeys. That alone is a good trait in them for what is worse than having to be running after the turkeys and have one's neighbors say to another, "so and so's turkeys annoy me so much, I wish they would keep them at home" and if they don't say it, they mean it anyway.

The White Holland turkey lays a good number of eggs and if anyone would turn over salt barrels and make nests in them, they would not have to hunt turkey nests for they are quite content to lay in them.

The White Holland turkey hen makes an excellent mother and the young turkeys mature earlier than most breeds and that appears to be the thing, for what feed it takes to keep a turkey will almost fatten a pig: So the earliest maturing bird is what we want. Some complain about the White Holland turkey that they are not large enough. The largest turkey is not always the most desirable for market. People living in cities do not always want an extra large turkey, unless for hotel or boarding houses, and often from appearance 'they' do not care for a large turkey, so the medium size turkey seems to be the most desirable. The White Holland turkey also makes a better appearance dressed for the market for they are naturally plump and do not have unsightly black pin feather marks on them, and when you once sell them, people want them again.

The White Holland turkey is an excellent table fowl, for the meat is juicy and not coarse and being small boned carves to a better advantage.

In conclusion I will say, the White Holland turkey is by no means the smallest turkey and, taking them from a marketable standpoint, that the day is coming, and is not far off, when they will net more per pound over the dark breeds of turkeys for they are neither too large nor too small and make a better appearance when dressed, and will yet take the day. I thank you ladies and gentlemen.

Mr. Codding—There is a new industry that has broken into the association this year and they claim that they are going to work wonders in this country. They have created quite a commotion and we are all interested in knowing something about the Belgian Hare.

THE FUTURE OF THE BELGIAN HARE.

By R. J. FINLEY, Belgian Hare Judge.

Since Adam ate the apple in the garden of Eden, and wondered what the future would bring forth, humanity has prophesied excellent, wonderful and mighty things on the one hand, while upon the other disaster, gloom and failure. So it has ever been and ever will be.

Passing down the centuries the optimistic star has risen higher and higher, brighter and brighter until it makes darkness seem light, and the pessimist of to-day is only throwing egg shells under the progressive car of Juggarnaut, and because they are so easily crushed sit back and whine, "it is a fad; a pursuit that temporarily engages the attention and interest of the people; a passing fallacy; a popular innovation; a capricious hobby." Do fads last forty or fifty years and increase in popularity and value during that length of time?

Nearly two generations of the human family have passed away since the Belgian hare made its appearance in England as a domestic, and it has been winning its way slowly but surely since among all classes, but especially among the laboring class. They were first imported into the United States by J. M. Hughes, of Albany, N. Y., in 1889, eleven years ago, and since that time have gradually and surely won a place in the industrial world that no other could occupy.

A conservative view of the future of the Belgian hare will make him the rich man's delicacy and the poor man's meat. Upon the table of the wealthy will be found the Belgian cooked in all the various forms, as a delicacy surpassing all other meats, while upon the laboring man's table and in his dinner bucket will be found the Belgian meat, excelling in quality all other flesh or fowl in flavor, supplanting the filthy, cancerous, disease-breeding swine flesh, and the beautiful, proud chanticleer, who calls us at early dawn, with his speckled harem. The quality of the meat so far surpasses all others that wherever introduced it is much sought after even at double the price of other meats, and for convalescents and the sick room surpasses all other flesh.

To enlighten those who are ignorant in regard to the growing popularity of the Belgian hare, I will quote the following from one of the leading magazines: "Believing most thoroughly in the continued popularity of the Belgian hare, and relying on the fundamental causes which insure that happy condition, were it not for skeptical humanity, one would feel like offering an apology for placing before the public an argument on a subject which, to all breeders seems an irrefutable, self-evident truth. Nevertheless axioms have to be proven, and the public with a legitimate doubt, which is nature's safe-guard, has a right to say: we acknowledge the Belgian hare's present success, but what do you know of its future?"

The friends of Robert Fulton ridiculed him while his boat was building, and more than one rich man was glad that he knew too much to throw away his money on such schemes. But when from the banks the little Clermont was seen moving along on the Hudson against both wind and tide, with the fearless benefactor of mankind upon the deck, the shores rang with shouts of delight, and those who had jeered were silent with wonder. Congratulations, not condolences, followed the trial trip, and on the next voyage the little craft carried a host of people whose doubts had turned to belief, and who fearlessly boarded the vessel amid the wildest enthusiasm. From one man's faith in a deeply founded conviction and his persistency in exploiting it, has evolved a commercial industry unlimited in power, and undreamed of in development. Such to a large degree has been the history of the Belgian hare in America. The pathway of his introduction was not smooth. Although his beauty and grace commended him, his practical merits were not obvious. To be appreciated he must prove himself a necessity. To do this required faithful allies, who extending the right hand of fellowship to a new, and untried vocation, would not withdraw the sustaining power until the industry, tottering through its infancy could stand unaided, in its strength, and look forward to a futurity crowned with success. All this has been accomplished. The beautiful Belgian made its appearance, found staunch friends, and his onward march has been unsurpassed in triumphs. His gentle ways and cleanly habits have commended him to all, his delicious, delicate juicy flesh has given him a pre-eminent place as a table delicacy, and as a food product he is sought, but not yet found in sufficient quantities. Among thous-

ands of instances throughout the United States, is that of a prominent club in one of our large cities, which has made an effort to secure at least two hundred pounds of Belgian hare meat per week, offering thirty-five cents per pound for this quantity. These facts prove the established position of the Belgian hare as a food product. Would this indicate any uncertainty to his assured permanency? The demand for the flesh alone is sufficient guarantee of his enduring popularity, and what shall we say, when is added to this, his handsome furry coat of finest texture and great adaptability? The food question is before the public, but the possibility of the fur of the Belgian hare is not even in its infancy. It is just awakening to birth as the people learn that their wraps of Electric Seal owe their origin to the fur of the Belgian hare. Carriage robes, foot-rugs, men's coats, caps, ladies' wraps, dress trimmings, and children's furs will be furnished under his own name at no distant day. Furriers all over the country are deeply interested and are investigating these features as business propositions for the future.

The permanency of the Belgian hare? As soon doubt that of the faithful cow or the never failing hen. What could insure greater permanency than an animal so fortunate as to supply at once food for the table and clothing for our bodies? Here are a few facts that show how the animal is regarded in the countries of Europe. In Paris the weekly consumption is one hundred and ninety thousand pounds. In France, Belgium, Germany, Holland and Great Britian, immense canneries are in operation, one cannery in England started on a capital of ten thousand dollars. In a year the company erected buildings costing $500,000, and although they controlled the production of great breeding farms, they were compelled to buy from Ostend 300,000 weekly besides the hares they raised. Great Britian and Ireland consume 70,000,000 pounds annually. It is not difficult to see the future of the hare in this country once he is established as a food product.

As the demand for supplying the wants of the human family have increased the sources have increased for supplying the demand

Some of the gray haired members of this association can look back to their childhood days when the tallow candle gave the only light at the quiet fireside or at the candy pull. It soon gave way to the whale oil lamp followed by the fluid lamps which our mothers and old maid aunties were so afraid would explode; next came the kerosene brought

forth from the earth creating a great commotion among the supersitious for they surely had discovered the ingredient which the internal fires would sooner or later come in contact with and consume the world. As the demand for more light increased gas was discovered, and to-day we chain the lightning and use it with greater safety than all the preceding luminaries.

In like manner as the people demand and require food it has been supplied. The cry for more and cheaper meat has arisen and the Belgian hare has come to supply that demand, and like all other new things it has enemies, and they are found to be those whose business is the most liable to be affected by its coming. This idea of a poor man or a widow who has only a little back yard or a coal house raising their own meat at a cost of only three cents a pound must be howled down. What is the future of the Belgian hare? As the manner of lightning our homes has advanced the past fifty years under persistent opposition so the Belgian hare has advanced until it commands our attention and demands acknowledgment as one of the foremost industries of the coming century. It demands the attention of the physician and nurse for the health of the patient. It is an industry that will furnish the laboring man's table with that which gives strength and vital force to withstand the day's labor. It will furnish strength and nerve the arm of her who goes forth to eke out a living over the wash tub. It will cheer the hearts of the widow's children. It will furnish meat to eat, and furs instead of rags to protect from the winter's cold, where despondency and future foreboding prevailed it will bring cheer and bright rays of hope for the future. The dawning of the morning that brings an industry (surpassing the poultry industry) has reached the western continent and buried itself so deep in the commercial system of the country that nothing but a change from the mortal to the immortal will succeed in staying its progress.

THE SHOW-ROOM AS AN EDUCATOR.

By Henry Steinmesch.

No argument is necessary to satisfy most every one at a Poultry Show that an exhibit of this kind is educational in its way, yet usually we find one person who can not see it that way, and that is the fellow who never shows, but always has just as good as the first prize winners—at home. No use trying to tell him anything. He has got "White Bramahs" that can reach up and eat corn off the top of a barrel. He has "Cochin Chinas" as fine as any at the show, or "Speckled Dominickers" and "Silver Spangled Wyandottes" that he raised from eggs that his Uncle in Illinois sent him four years ago. I don't think he is a Missourian for "we don't have to show him." Taking the show-room as an educator I do not know that I can do better than recite some of my own experience. I commenced to show chickens at the St. Louis Fair in 1888. I entered a pair of Silver Wyandotte chicks; someone else had entered a pair—anyhow there were just two pairs in competition and I got second. No boy with a new pair of boots felt quite as important as I did. Next year I entered for breeding pen, old fowls and young chicks, about sixteen birds. Some other parties had also entered a string so that there were about fifty birds in competition. When the awards were placed the judge went by my coops and put all the ribbons on the other displays. I didn't get a ribbon. If there is anything that will take the conceit out of a person it is an experience like this. I do not remember, but my impression is that for about twenty-four hours I was in a quandary—whether to cuss the judge or the superintendent, give my competitors a piece of my mind, or go to the fair association and tell them I would never show with them again. However, after another twenty-four hours I cooled down and I sneaked up to the coops containing the winners and just peeped at them, and as no one shooed me away I straightened up and looked at them. The owner happened to come along and explained to me some of the good points of his birds and also kindly called my attention to the feathers on

the legs of some of my pullets and nearly solid white ear lobes on one of my cockerels, and to round up with suggested that I buy a Standard. The show-room as an educator? Well, I carried a few points home with me from that show-room to study out at my leisure. There is one thing about an education under such circumstances and that is, it is liable to be lasting. It taught me that if I wished to be successful in the poultry business I must go to school and learn. The show-room is the school-room. We may attend a show and notice the judge cut a comb 1, 1-2, neck color 1, back color 1, shape 1, 1-2 and so on, but unless we have birds there in competition, the lesson is not duly impressed on us. We have nothing at stake. On the other hand if we exhibit, though our exhibit may be ever so small, we have a direct interest in the result and for that reason the lesson will be likely to be more strongly impressed on us. The show-room is also an educator in this respect: it brings out birds in competition. It will teach us that if we would succeed we must put our birds in show condition. Too often we hear the remark—"these birds are just as I picked them up and brought them in." Those who follow that rule will get left nearly every time even though they may have the best birds. The show-room will teach us what our favorite should be in shape and in markings. It will teach us that the comb should be so, the eye a certain color, the breast a little more full or the back a trifle shorter. It will teach us that to breed better birds than our competitors we must improve. It will teach us that the "loss" of a sickle feather because of probably too much white or the pulling off a primary or a secondary because of too much black will not help us any, for the judge will be looking for those identical features and if they are not there will give the bird the benefit of the doubt by charging the absence of these feathers up to the owner. It will teach us that there is room at the top. It will teach us that to succeed we must keep everlastingly at it and it will also teach us that the Golden Rule can be as appropriately applied in the poultry business as in any other: "Do unto others as you would have others do unto you."

Mr. Codding—When our program was issued, Mrs. Maxwell was down on the program for a paper on the subject: "The Grip Which Women Have Gained Upon the Poultry Industry." At the request of Mr. Rippey of the State Board of Agriculture, she has changed that

subject and will speak to you on the subject of "Poultry at the State Fair." When she started to write this article she tried to get what data she could as to what the state fairs in the different states were doing for the poultry industry, but was unable to get very much on that line, so while her paper may not be directly on that subject, it has a bearing on that line. We will now hear from Mrs. Maxwell on the subject "Poultry at the State Fair."

POULTRY AT THE STATE FAIR.

By Mrs. Della Maxwell, Fayette, Mo.

If a pair of mammoth balances could be suspended from the moon and on one side all the male population of the State be placed, and on the other side the poultry and eggs annually produced in the State, there would be a sudden drop in the poultry industry and an equally sudden deportation of the lords of creation to some where in the blue ethereal, yet unmapped and unconquered by hardy Americans.

If a great see-saw two miles wide and long enough to stretch from Iowa to Arkansas could be lain across the dome of the capitol and on the one end be placed the annual poultry product of the State, and on the other end, the annual crops, of oats, flax seed, timothy seed, clover seed, millet seed, cane seed, cotton and cotton seed, tobacco and broom corn and rye the poultry product end would descend with the terrific crash of nearly one hundred million pounds of surplus weight. To *many* this may seem almost incredible, nevertheless it is true, the cold unvarnished facts, that seem stranger than fiction.

The State Labor Commissioner, the Hon. Thomas P. Rixey, has shown that the value of the surplus wheat crop of the State was five million dollars, the corn crop and oat crop combined, less than two million, while the *poultry* product of the State amounts to over twelve million dollars, an amount, greater in fact than the entire surplus farm crops of the State. Only two products of the State, cattle and hogs yield a greater income than the fowls of the barn yard.

Missouri produced last year nearly four hundred million pounds of

flour valued at seven million dollars, while the cackling hens, unknown and unnoticed, laid in the weeds, in fence corners and in diminutive and illconstructed chicken houses over four millions of dollars worth of eggs besides thousands eaten up on the farm, sucked by bad boys, farm hands and hounds. A single vast elevator, full of belts, bands and buzzing wheels, stretching its lofty head to the clouds and attracting the wondering gaze of the passing multitudes, proclaims to the world that this is a great grain growing State and that *wheat* is king, yet the truth is that the modest hen scratching away in the litter and trash of the barn yard, is of vastly *greater* benefit to the State and yields double the revenue to the farmer's wife, to the farmer, to the merchant, lawyer, doctor and business world than does the grain.

The greatest lead and zinc mines in the world are in our State; they have attracted world-wide notice, and men and women have been drawn to our southwestern counties by the magic of mining, vast fortunes have been made in a day and lost before the rising of the morrow's sun and yet the value of eggs and poultry shipped annually is more than twice as great as either all the lead or zinc, and lack but the trifling sum of two hundred thousand dollars of being equal in value to the entire output of all our mines, zinc, lead, iron and coal.

Missouri is a great lumber producing State. Last year our saw mills cut two hundred and eleven million feet of hard wood lumber, valued at two million five hundred thousand dollars, and three hundred and thirty one million feet of pine, birch, cypress, cotton wood and other soft woods valued at two million eight hundred thousand dollars. The value of all forms of timber, including lumber of every description, logs, railroad ties, piling, cooperage and cord wood amounted to twelve million six hundred thousand dollars, while the *poultry* business amounts to twelve million four hundred thousand dollars. Thus showing an insignificant balance of only two hundred thousand dollars in favor of the lumber and timber business.

The Missouri mule follows the drum beat of the advancing armies of civilization around the world; he kicked at the ancient glory of Spain in Santiago and brayed in triumph upon the summit of San Juan Hill, carried provisions to the besieged at Lady Smith in South Africa and to our own legation in China's capital, still with all his military importance and world renowned qualities he together with his associates, the

Missouri horse brought not quite one-half as much to the farmer's bank account as did the poultry.

There is nearly seven thousand miles of steam railway now in operation in Missouri, which owing to the level character of the land over which it travels, it is safe to estimate that the total cost of construction did not exceed seven thousand dollars per mile, which in round numbers gives us fifty million dollars. The entire State with the exception of five counties is a vast net work of railroads, throbbing with industry and employing tens of thousands of people, and strange to tell every mile of track now operated in this State, could be built and paid for in five years with our surplus poultry product.

The entire surplus production of the State in 1899, from every source, cattle, hogs, mules, horses, sheep, *all* kinds of grain, lumber, logs, timber, iron, zinc, lead, nickle, coal, fruits, vegetables, tobacco, cotton, poultry and eggs, the grand total surplus from, pasture and fields, from orchards and gardens, from mines and forests amounted to a little over one hundred and thirty-five million dollars. One eleventh or twelve millions of dollars of this vast sum was furnished by the gobbling turkey, the noisy guinea, the senseless goose and the cackling hen.

The annual surplus poultry products of the State would give employment to forty thousand men for one year at twenty-five dollars per month each and thus the Missouri hen could in one year build for herself a monument greater than the pyramids of Egypt, taller than the Washington monument, more costly that the statue of "liberty, enlightening the world," more massive than the Colossus of Rhodes, or she could build a vast amphitheatre, more capacious and grander than the celebrated colosseum of ancient Rome.

She could build and equip with the latest improved armament four first-class battle ships larger than the illfated Maine, could build the finest state house in the nation in two years and in five years she could secure a controlling interest in two-thirds of all the gold and silver mines in the world or break up any trust now in existence.

Great, *imcomparably* great is the queen of the barn yard and yet all these years she has kept the "even tenor of her way" unheralded, unsung, unhonored and unglorified. No rings have been put upon her finger, no fatted calves have been killed for her, no feast has been spread for her although she appears at feast, spiced, pickled, in salads, in hash,

dressed, stuffed, smothered, baked, boiled, fried, stewed and in every other conceivable form and fashion. Nevertheless she has never lifted her feeble voice in complaint but like the beautiful dark eyed Hebrew maid who gleaned in the fields of Boaz she has garnered and gathered *only* that which the reapers had left.

Burn down every school building in the State and the surplus poultry product for one year, would rebuild them, refurnish them, and pay the salaries of all the teachers for one year and have a handsome surplus left to donate the charity. Let us see if this is true: The annual poultry product is over twelve million dollars; this sum divided by 114, the number of counties in the State, gives us over one hundred and five thousand dollars per county, 40 school houses to the county and at an average cost of one thousand dollars each gives us forty thousand dollars.

Fifty teachers at fifty dollars per month gives us two thousand five hundred dollars per month and for seven months we will have spent fifteen thousand five hundred dollars, for teachers salaries, and forty thousand dollars for school buildings, or a total of sixty-five thousand five hundred dollars. This from one hundred and five thousand dollars leaves us thirty-nine thousand five hundred dollars, surplus for each county. This sum expended for good sorghum molasses at twenty-five cents per gallon would buy one million five hundred and forty-two thousand gallons for each county, allowing the counties to average thirty thousand people we could furnish every man, woman and child in the State fifty-one gallons of sweetness that would enable them to "stick together closer than a brother," and get any size appropriation from the Legislature that they might desire, and at the same time keep them sweet spirited enough to pay their State taxes without grumbling. So far we have been dealing with the entire State, let us look for a moment at the results in a few individual counties, Jasper county stands first in the amount of surplus products shipped, having five and one-half million dollars to her credit; standing next to Jasper is St. Francois county with nearly five million dollars, these two counties are the greatest lead producing counties in the State and yet each is largely indebted to the poultry business to give them their prestige over counties not having rich mineral deposits.

Texas county has no mines and but little poultry, hence she stands

at the foot of the list, having sold, leaving out of count the rabbits and other wild game, less than one quarter of a million dollars of surplus products, twenty odd thousand dollars for her poultry and eggs. Johnson county stands first in the amount of poultry sold, having shipped over seven million pounds and over a quarter of a million dozen of eggs and received in return therefor over five hundred thousand dollars. Thus every man, woman and child in Johnson county received $16.66 2-3 each from the poultry business. Howard county fell but little below Johnson, having shipped over six million pounds of poultry and two hundred and sixty thousand dozen eggs, to say *nothing* of the thorough bred fowls and eggs shipped for hatching. It is quite safe to put our income from the poultry business last year at five hundred thousand dollars—a sum almost as great as the deposits in all the banks in the county; more than one-third of all the surplus products of the county. One year's surplus poultry product of this county would buy its surplus horses and mules for five years. Howard county's poultry product brought more money to her last year than did the cattle by nearly one hundred thousand dollars and this too in spite of the fact that we have no less than twenty herds of thorough bred cattle some of which took sweepstake prizes at the Worlds Fair in 1892. No county in the State can boast of finer cattle than Howard, yet the Shorthorn, the Aberdeen Angus, and the Hereford must bow and yield the palm to the Howard county hen. But it must not be supposed that only a few counties in the State derive large profits from the poultry industry. On the contrary *every* county in the State obtains from one twentieth to one-third of their income from the poultry business. And this profit is shared alike by every grade, class and character of society.

Like the all encircling air, queen Chic-a-biddy knows no distinction of class, she holds no prejudice against the rich, no hatred for the poor. She knows no north nor south, no east nor west, her products enrich the rough fare of the woodsman and as he fells the forests, steams invitingly upon the humble board of the miner or goes with him into the bowels of the earth to refresh and strengthen him as begrimed and sooty he eats his frugal meal. She enters into the richest viands and costliest morsels that grace the table of the rich and noble, gives richness and flavor to the daintiest confections, and makes eggnog, Tom and Jerry, egg phosphates and hundreds of other drinks with-

out which a large part of our male population would never know when Christmas comes. She is as ambiguous as man's discontent, as omnipresent as woman's curiosity. If the miner digs beneath the earth the Missouri hen scratches above him, if the fruit grower brushes the caterpillars from his orchard the chickens are there to eat them, if the wheat grower can not get every grain of wheat with his reaper his fowls will follow him to "gather up the fragments that nothing be lost." If the stock-men in feeding their lowing herds drop here a grain and there a grain the ever present hen points them out to her chicks. If the horsemen shakes a few hay seed from the hay and the wild winds of March fling them hither and thither here and there patiently and perseveringly the hen scratches them out and delivers them to her brood. In the quaint language of the old negro preacher—"wheresoever the old hen scratches, thar' will be a bug also." No other industry requires so little capital. No other business is so sure and certain of profitable results, or requires less labor to prepare for market consumption. The wheat industry requires millions of dollars expended in seeders, reapers, threshers, elevators and mills. The cattle industry requires vast barns and sheds, hundreds of acres of pasturage and mammoth trust producing packing houses. Horses and mules almost invariably eat their heads off in the corn and hay and require closest attention and care. It has been estimated that owing to the expensive machinery and the uncertainty of results, that for every dollar made in mining, fifty are lost. Orchards require years of constant care and patience, and fail as often as they produce. The timber industry requires tens of thousands of dollars laid out in wagons, teams, saw mills and labor, but the Missouri hen will fly laughingly and cackling from a newly laid egg deposited in an old cast off summer hat into the open hands, of the huckster and turn her product at once, with economy, into gold and silver. The turkey will find herself a nest in the heart of the virgin forest and there lay her eggs and raise her brood.

The Missouri hen is no less independent and expensive, she feeds upon the crumbs that fall from her master's table, finds shelter under his house, in his stable, woodshed or any other place where she can find a bunch of straw or handful of dead leaves and trash. She has asked but little and received less. How many farmers think it is necessary to store away chicken feed for winter, or build them the shelter from storm

and snow they so much deserve. Compelled to roost high in the trees for protection against depradating varmints, how often the cold blasts of winter freeze them stiff and stark and hurl them dead to Mother Earth their truest friend. It is for this reason that the poultry industry is at once the most universal and of the greatest benefit to inhabitants of the State. No man is so poor, no widow so helpless but that they can raise a few fowls and these few with but the meanest care will soon multiply and increase until the humblest home can occasionally feast sumptuously and enjoy thousands of comforts and necessities of which they would be otherwise deprived.

The grocery and dry goods merchants of the State could fill volumes with pathetic stories of tiny baskets of eggs and shivering, shrinking, timid little girls, and decrepid and feeble old women who have come to buy a little sugar or coffee or a cheap handkerchief for mamma's birthday or a tiny toy for baby brother or sister to whom Old Santa has always been a stranger.

Sacred history records the fact that a flock of ravens carried crumbs to a disheartened and discouraged Prophet, but he who records the history of Missouri must tell the story of how many thousand birds of the barnyard have clothed the naked, fed the hungry and gave to him that was thirsty drink, and many a poor widow's barrel kept filled with meal, and many a coaloil can that has been filled with oil by the Missouri hen.

The breadth of brain and strength of brawn of her yeomanry places her in the very front of the sister-hood of states. For such a proud and imperial State, shall we build a hovel, or a palace? Other states have made ample provisions and appropriated thousands of dollars for the annual exhibition of her poultry product. Shall Missouri do less?

Remember you will not get more than you ask and there are enough poultry raisers in the State to drive every man out of the Legislature who would not support a bill favoring an industry of so great and universal importance. Every man in the State is either a poultry raiser of a poultry eater. There are no anti-poultry people, therefore "ask that ye may receive" and ask abundantly that ye may receive what you need. Keep the tremendous and amazing facts and figures of the poultry business everlastingly before the people. See to it that the country newspapers, the most potent factors in state politics, under-

stand what is needed and also that the country press have a "realizing sense" as the old preachers were wont to say, of the vastness, the bigness and the overshadowing importance of the poultry business. The press will enlighten the people and the people will demand and receive the desired appropriation.

There is not a county, nor township, nor school district, no not a section of land in the State that does not support a flock of fowls. They swarm around the iron mines and lumbering camps of the southwest, they cackle and gobble and crow amid the roaring blasts of the lead and zinc furnaces in Southwest Missouri, in short, wherever the curling smoke rises from man's habitation, they are there to enrich his table and afford him comfort and pleasure. And yet because Christ said of the poor "Ye have them always with you" the value, the worth, the importance and magnitude is unknown, is unrecognized, is unappreciated. On *this* subject our people are ignorant, therefore I have dwelt upon the importance of this industry, and have shown you that the poultry industry *is first* and should have the greatest attention and consideration at the hands of our Legislature. Now after all this array of facts and figures, that startle, astonish, amaze and bewilder shall we ask for the paltry sum of twenty-five thousand dollars to establish a permanent building at the State Fair? Would it not be much wiser and more in harmony with the magnitude of the poultry industry to demand not one cent less than fifty thousand dollars. Not one cent less would be doing justice to the thousands of tax payers of the State, whose chief source of luxury is derived from the annual poultry sales: not one cent less would be a credit to a State whose geographical position together with her matchless natural resources, marvelous variety of soil and climate eminently fit her for the highest rank.

I have ignored the natural trend of the subject assigned me because I felt the necessity first of a sufficient poultry building, erected on our State Fair grounds at a cost in harmony with the extent and character of the industry it would represent. The best way to secure this end is to enlighten the people upon the subject, swing sledge hammer blows upon facts and figures, hurl the overwhelming logic of the stupendous business before the voter, until every child of the State shall become a missionary, teaching the ignorant and enlightening the careless and indifferent. Let me close by saying that the next candidate for the Legis-

lature in this county will have to declare himself in favor of a liberal appropriation for a handsome poultry building, of stone, brick, glass and steel, and one too, that will be a credit and not a disgrace to our grand and imperial State.

THE MISSOURI STATE FAIR.

By Col. R. C. Clark, Fayette, Mo.

Mr. Chairman, Ladies and Gentlemen:—I have been very much entertained this week, but I feel somewhat lost to-night. I am mixed up a good deal. I was out at the Swine Breeders' Association meeting last night and heard some most excellent talks and questions about the breeding of swine and I made up my mind that if I changed my vocation I would go into the swine business, the raising of hogs. This morning I heard a most excellent address by Dr. McAlister and after I heard his paper on thoroughbreds I went away concluding that I would change my vocation but not raise hogs; for I made up my mind to raise horses. To-night I have heard these most excellent papers by the poultry men and am fully satisfied I am going to drop hogs and horses and going to take up chickens if I can get straightened out at all. I heard a story once that explains my situation to-night. It was in regard to a dog that was being carried along on a train and a fellow came along and looked in the car and said: "Where is the dog going?" The expressman answered: "I don't know and the brakeman don't know and the dog don't know because he has chewed his tag off." That is the way with me, I do not know exactly where I am.

Another embarrassing matter meets me just as I begin my talk to-night. I do not know much about these swine breeders and poultry men, it is out of my line. But they asked me to say something about the State Fair and it was the first time that I knew there was a State Fair. I thought maybe I would see something about it in the papers, but this most excellent paper by Mrs. Maxwell has almost knocked me out. I have gotten some figures upon the poultry industry, I have had

the same trouble in getting them that Mrs. Maxwell has had, but she knows more about them than I do.

I want to say that the most startling investigation I have ever made upon any line has been in this poultry industry. I have had occasion to look into it somewhat, since I have been thinking what I was going to say. Mrs. Maxwell gave you a statement of the different products in the different parts of the State and she spoke of the products of Howard county. We being Howard county people, and you strangers, we like to crow over it. If I had made my speech first I would have said we were the banner county in poultry products, but she has already said Johnson beats us a little. In this county last year, according to my calculation—I give it to you for what it is worth—our surplus product of dressed poultry and eggs—putting live and dressed poultry at six cents a pound, amounted to four hundred thousand dollars. If my reputation was not good for truth and veracity I would not make this statement in this audience. Nearly half a million dollars was paid out in this county for poultry last year. That is a wonderful statement. When we take into consideration the wonderful progress we have made in this State, not only in the poultry line, but in cattle and hogs, in the mining industry and the fruit industry, is it any wonder a man should take pride in being a Missourian? I have always been proud of that. We have the best State and the best country in the world. But when we investigate and find out what wonderful resources Missouri has we certainly have a right to feel proud; and to-night, as I stand before you a Missourian, born in Missouri and in this county and this town of Fayette, I feel gratified that these associations have been meeting with us this week, and from what I have been hearing, I am satisfied we are on the road to progress and prosperity in our great State.

I find from investigation made in the last few days that this matter of a State Fair has been agitated by the different organizations in the State of Missouri for some ten years. Ten years ago they had a meeting in Sedalia where they agitated this matter and it has been agitated at the different meetings of our associations ever since. At the last Legislature there was passed an act authorizing the State Board of Agriculture to locate what they called a State Fair, to be under the control of the State Board of Agriculture and it seems that after some examination into the different sites competing for it, that Fair was located at Sedalia,

and that is what we call the State Fair, and I want to say something about it.

My first recollection of fairs dates back to a good many years ago—I won't say how many because it is not necessary. But when I was a little boy in this county I remember well when my father began to show cattle at the county fair, and I remember on one occasion he paid a hundred dollars for a calf in Boonville, and I think after he brought that calf home, people came for miles to see a calf that cost a hundred dollars. It was a calf five months old. It was the beginning of a herd we established after that; and my first recollection of fairs was when I used to go with these cattle along with the negro man, and when the negro led them into the fairs, how anxious I was that our calves should get the ribbon premiums. And I suppose the people of Howard county have all sorts of silver cups and things of that sort as a relic of county fairs, before that.

Things have changed since then and I can see the importance of the different organizations in our State concentrating their efforts into a State Fair. We have gotten to having street fairs lately. I never saw one until last summer. I lost my head almost in a street fair. Everything was going on so rapidly I did not feel that I was more than twenty, and possibly acted that way. But the Industrial Organizations of the State have seen proper to organize this State Fair in order that there might be a concentration of effort of the whole State of Missouri in building up a State Fair. Now I think it is a good thing. I have understood that many farmers are against it. I can not conceive to save my life what objection a farmer, or a man in any industrial occupation could have to a State Fair. It seems to me that it will be conducive to the interests of men in every department of the agricultural industry, the hog men and the horse men and sheep men and the cattle men and the poultry men and women. (I say women because I notice the men do not have much to do with it. That is one of the peculiar vocations of the women, and perhaps that is one great reason why it has had such wonderful success. When women take hold of anything it is bound to go. It can not stop.)

There was a remark hinted at in Mrs. Maxwell's paper that I want to bring out; that is the agricultural people have gotten the State Fair, the Legislature has passed the bill and located the State Fair for you,

now what are you going to do with it? Are you going to let it die? You have gotten the land donated by the county of Pettis and it is now the property of the State of Missouri and improvements have already been begun on the grounds there. The great question that confronts the agricultural interests is what are you going to do with your State Fair? It seems to me that there is but one thing to do, to go to work and have your Legislature make sufficient appropriations for suitable buildings, not only for the poultry industry, but for all the industries that may be necessary in order that the State Fair may be a success.

I find one peculiar feature about that State Fair bill—possibly you never thought of it—a lawyer looking at things of that sort would naturally see a thing of that kind where other persons would not see it. It is a remarkable feature to me, and I am surprised that you agricultural people ever allowed it to pass the Legislature with that kind of a provision in it. It seems that there is a provision in the bill authorizing the location of the State Fair for the State of Missouri saying that no revenue shall be provided or shall be given or appropriated out of the general revenue fund, by the State of Missouri, for the promotion or maintenance of this State Fair. I do not understand how that happened to get into the bill. I was not in the Legislature at that time and knew nothing of it. That is a very remarkable feature of the bill, but I think it can be gotten around in this way. At the coming Legislature the farmers ought to organize, and if they do as they ought to and as the lady has suggested in the paper—these chicken and poultry women—I mean people that raise poultry and eggs and chickens—if they all go together and determine that they will have this appropriation, it does not make any difference what has been passed by the Legislature before them, the Legislature will give them anything they want if they are backed by the farmers. The trouble about the farmers is they can not agree among themselves. I have had some experience—not along this line, but other lines—about appropriations and find it is harder to get an appropriation through that benefits them especially than it is one that benefits people other than farmers, because you do not agree about matters, you are not in accord about what shall be the appropriation.

It seems to me the first thing necessary is that there should be a large appropriation for this State Fair. Now we do not want to be behind other states in this matter. It is certainly an industry that would

deserve the admiration and support of all Missouri's citizens, irrespective of parties. A great many states adjoining us have made appropriations for their state fairs that after a little while will become self-sustaining and not be any tax upon the State at all.

I am indebted to Col. Rippey of the State Board of Agriculture for some statistics of appropriations made by other states in regard to their state fairs and how they control them, and for your information I will refer to a few of them.

"Illinois and Ohio have each expended over $500,000 for equipment of their grounds and Ohio last spring gave about a hundred thousand more for a horse stable that was to cover about three acres, and Ohio gives annually about $33,000 for agricultural premiums.

"Indiana has probably about $400,000 invested in her State Fair. Originally she gave fifty thousand dollars for the purchase of a site and when Indianapolis grew all around this site it was sold for some $350,000 and another site selected out of town, but between the two railroads; and to this amount the State has made some additions, making a total cost of about $400,000. Indiana gives $10,000 annually in payment of agricultural premiums.

"The State of Iowa and the city of Des Moines have given jointly $250,000 to the Iowa State Fair and during the last twelve years has given $36,000 for agricultural premiums, and she pays annually to each county society two hundred dollars.

"Minnesota has given $100,000 for the establishment of her State Fair and four thousand annually for agricultural premiums.

"New York gave $200,000 and $22,000 annually for premiums.

"Wisconsin gave $150,000 for establishment and $6,000 for annual support.

"California appropriates annually $20,000 for her State Fair and $2,500 for each district fair.

"Connecticut gives annually to her State Fair $2,500 and a total of $5,800 to her county fairs.

"Massachusetts gives annually $20,000 for agricultural premiums.

"Maine gives $3,750 for agricultural premiums, Maryland, $5,000; New York, $22,000; Nebraska, $2,000; Oregon, $5,000, and Rhode Island, Pennsylvania and other states make annual appropriations, but I have not the amounts."

Now we find that other states gave these appropriations and if we see that it is to the interest of the industrial people of the State we should have an appropriation commensurate with our greatness. We have a greater State than any of these. It is the fifth State in the Union now and in many industries we are the first State in the Union, and in a little while we will be toward the top, the second or the third in the Union, and if the great agricultural interests of the State of Missouri will agree that this State Fair is for the best interests of the great farming element, the great agricultural element of our State, and that there should be an appropriation for this State Fair, it can be done. And I am satisfied that if the farmers and their wives and daughters take it into their heads to see that this State Fair is carried on, it will be a grand success.

You must realize that the State Fair is not a local interest. I have heard there was some little talk about the location of that Fair. Some of the farmers thought it was not located properly and there was quite a sharp competition for its location. But it has been located by the State Board of Agriculture, and I presume that they located it at the right place, and in order for it to be successful and a great institution and one that the State of Missouri will be proud of and that will attract the attention of the United States and of the world, it is necessary that the farmers and the great agricultural interest of the State of Missouri should realize that it is the Fair, not of Pettis county, but of the State of Missouri and that it should be fostered and cared for by this whole State of ours.

There is a great advantage in a State Fair. A county fair is a good thing, it produces competition. But I notice a great many cattle breeders go off to these large fairs like the one at Chicago and Omaha and state fairs like Iowa and Ohio and get a great many premiums. We bring back to Howard county a great many premiums that we have won on our cattle and chickens. I can not quote the statistics exactly, but I find at the Omaha Exposition, for instance, that Missouri took more premiums there than any other State, possibly more than all the other states represented there, in the agricultural department, and yet a great many of our cattle and hog and poultry breeders were not there. At Chicago it was said Missouri brought away, I believe it was, forty thousand dollars in premiums from the World's Fair, and if we can do these grand things

away from home, why can not we do them at home? It seems to me that our opportunity has come, for the people, not only those locally interested, but the *whole* people of Missouri to see that this State Fair shall be fostered and carried on until it shall be a success that will command the admiration not only of the people of our State but of the whole world.

There has been a good deal of work done for the State Fair at Sedalia already. You know it was located by the State Board of Agriculture October, 1899, and a good deal of work has already been done on the grounds, so Mr. Bothwell tells me.

Our other institutions in the State of Missouri, and we have a large number of them, and like to have our attention called to them, call, and rightly so, upon the Legislature year after year for maintenance. There is not one of them but has received appropriations from the Legislature time after time in order to maintain it and keep it in proper condition. And I believe if you get your appropriation and buildings properly erected and plans executed and the State Fair properly managed, it will be a self sustaining institution and that seems to me to be one great reason why the State should be willing to give the proper appropriation to put it on its feet.

The following is a statement of what has been done by the State Fair management at Sedalia, furnished me by Mr. J. H. Bothwell, of Sedalia:

By an act of the Fortieth General Assembly there was established a State Fair for Missouri, and the control and management thereof was committed to the State Board of Agriculture. Under the provisions of that act the State Board of Agriculture considered all propositions made by competing towns and cities, and selected the site, which, in their judgment, would inure to the best interests of the Fair and the State in general, and permanently located the State Fair in Pettis county, adjacent to the City of Sedalia, on a suitable tract of land embracing 160 acres in all, of which 136 acres constitute the State Fair grounds conveyed directly to the State of Missouri, and about twenty-four acres are held in trust, to be sold for the benefit of the State Fair fund.

The State Board of Agriculture organized as a board of directors of the State Fair by electing Norman J. Colman, president; N. H. Gen-

try, vice-president; and J. R. Rippey, secretary. Charles W. McAninch, of Pettis county, was elected as local treasurer. An executive committee was selected to take charge of the State Fair grounds, and to proceed with the improvement of the same, which committee consisted of Messrs. Colman, Gentry, Maitland, Ellis and Rippey. By direction of the board of directors, the executive committee was authorized to employ surveyors, civil engineers, architects, and other special agents necessary to the work in hand. By authority of the board of directors the executive committee was authorized to visit the State Fair grounds in other states for the purpose of gaining necessary information.

The State Fair grounds are beautifully situated on a high, undulating ridge of land near the southwest part of the city of Sedalia. The Missouri, Kansas & Texas Railway runs along the entire south boundary of the fair grounds, and will construct there a station for handling freight and passengers. The Missouri Pacific Railway has been granted the right to construct a branch line along the west edge of the State Fair grounds, and has acquired the right of way from its main line of railway across to the Fair grounds, and already the entire branch line has been graded, and will soon be constructed and ready for operation with a proper station at the Fair grounds. In all essential matters the situation of the grounds are everything that could be expected or desired. These grounds, and the additional tract of twenty-four acres, were donated by persons interested in the city of Sedalia. Electric street railways and electric light and power are to be supplied and connected with the grounds. Also city water mains are to be carried to the grounds. It is estimated that the reasonable value of the property, privileges and the interests secured to the State through the proposition made by the people of Sedalia, would exceed forty thousand dollars, which accrues to the State without other consideration than the permanent location of the State Fair at that point.

In the winter of 1900 the executive committee visited the State Fair grounds of Ohio, Indiana and Illinois, which are among the most modern, successful and best equipped State Fairs in the country. In the early spring a civil engineer was employed to make a topographical survey of the grounds, and to assist in the location and laying out of the racing and training track. Later an architect was employed to advise and assist the executive committee. Mr. N. H. Gentry, member of the

State Board from the Seventh district, residing in Pettis county, was selected as superintendent of grounds and construction of buildings.

During the summer of 1900 Superintendent Gentry, with the civil engineer and architect, visited the State Fair grounds at Columbus, Ohio, and at Springfield, Illinois, and spent several days in acquiring additional information needed.

After the location of race track and preparation of specifications therefor, the superintendent advertised for bids for construction of the same. The bid of Menefee & Heck was accepted, and a contract let to them for the construction of the race track, with a provision in it that the superintendent could stop the work whenever four thousand dollars had been expended thereunder, and with the privilege to the contractors of terminating the contract at that time if he saw fit to do so.

The only fund available for the improvement of the State Fair grounds was that fund accumulated under the provisions of an Act approved April 7, 1897, entitled, "An Act to punish book-making and pool-selling by unlicensed persons; and to provide for the issuance of such license, and to dispose of the funds arising from such license," as amended by an Act approved May 17, 1899. By Acts of the Fortieth General Assembly, approved May 24, and May 29, 1899, there was appropriated for the use of the State Fair Board all of the fund accumulated, and which would accumulate during 1890 and 1900, from the operations of the said law, entitled, "An Act to punish book-making, etc.," to be used in the establishment and maintenance of the State Fair. On the first of January, 1900, the amount of this fund was $8,651. During 1900 there has already been accumulated and added to the fund the sum of $9,316. Total, $17,967.

With so small a fund available for the improvement of the Fair grounds and maintenance of the State Fair, it soon became evident that no State Fair could be held in Missouri in 1900, and that only by the strictest economy and most careful management could any satisfactory beginning be made toward the proper improvement of the State Fair grounds until other funds could be drawn on for that purpose. In order to begin the work of improvements, and to expend the available funds judiciously, plans and specifications were prepared for one speed horse stable, forty feet by fifty-six and one-half feet floor space, and a contract let to H. M. Hammond at the price of $1,850. Also for one horse barn

(for breeding and all-purpose horses) sixty-eight feet by 120 feet, floor space, let to H. M. Hammond at the price of $4,400, and for one cattle barn, sixty feet by 120 feet, also let to H. M. Hammond at the price of $3,540. These buildings are now in process of construction, and will be completed before the close of the year, unless that is made impossible by bad weather. They are planned and arranged after careful examination of such buildings throughout the country, and each will be substantial and modern and well suited for the needs of the State Fair. However, they will be but three out of a large number of similar buildings needed in order to accommodate the live stock that will be entered at the first fair held, and it will be necessary to provide for the construction of a number of similar buildings before any fair is held.

The work of construction of race track, and the grading of drives and walks has not been completed, but was necessarily suspended for want of funds to carry out the plans. The executive committee employed Mr. George E. Kessler, of Kansas City, as landscape architect and engineer, to make plans and specifications for the proper laying out, grading and improvement of the Fair grounds, and he is now preparing plans and specifications which will be ready for use at an early date. Also Colonel J. G. Joyce, civil engineer, St. Louis, Mo., has been employed as advisory civil engineer, for the purpose of securing the benefit of his knowledge and experience in the construction of the racing track. Every precaution has been taken by the board of directors and executive committee to prevent mistakes, and to have the work begun in such manner as will insure the most perfect arrangement and the most satisfactory improvement of the State Fair grounds.

In other states where State Fairs have been well established and are successfully conducted, it has been found necessary to expend from $300,000 to $400,000 in the erection of the many buildings necessary for the permanent use of the State Fairs. It was also found that when well established, and the grounds properly improved, their State Fairs are practically self-supporting institutions, and that they are of great advantage to the industrial interests of the several states in which they are maintained. It is respectfully suggested that Missouri is so situated as to justify the belief that a State Fair when once well established can be so conducted as to be of lasting benefit to the people of the State. Our stock raising, agriculture and all other industries are unsurpassed

in other states, and the benefits to our people of proper competitive exhibitions can not be over estimated. Then the advertisement of our resources, and of our products, and especially of our live stock can be made that the annual State Fairs would result in the gathering each year at our State Fairs of progressive men from all over the west and southwest and the middle west, who would come to investigate the stock interests of the State, and to purchase the products of our stock farms and other allied industries.

The General Assembly will no doubt carefully consider this new State institution, and extend to the State Board of Agriculture proper assistance, and make liberal appropriations for the erection of buildings and improvements of the State Fair grounds.

While other State institutions justly merit and will actually need the help of the State in extending them and in carrying them on, the Missouri State Fair is in that condition which makes it essential that there shall be appropriations of money for the erection of buildings before any benefit whatever can be derived from the institution. Without such assistance from the State as is suggested, everything that has been done would prove of no avail. If a liberal appropriation is made by the General Assembly in the winter of 1901, the State Fair grounds can be sufficiently improved to enable the holding of a successful fair in September or October in that year, and in each succeeding year. It is to be remembered that the improvements of the Missouri State Fair grounds are not for a few weeks or months, or for only a limited term of years. All substantial improvements that will be placed on the grounds, and all the substantial planning and laying out of the grounds, will be for the use of the people of this State through many decades, and much of the valuable improvements will likely be of use to the people for generations to come. Also it is to be remembered that this is one—and possibly the only one—of our State institutions that can be successfully carried on without any considerable expense to the State after it is once fairly equipped and well established. These and other considerations suggest that there should be a liberal course of treatment at the outset in the proper improvement and maintenance of the State Fair grounds.

Mr. Codding—While we are on the subject of the State Fair, I would like to hear a few remarks from the president of the State Fair, Gov. N. J. Colman.

Gov. Colman—Mr. President, ladies, and gentlemen; It is too late to-night for me to enter into the discussion of that question. I believe that you will see by the program that I am to speak upon that subject to-morrow morning, if there is anything left for me to say, for my friends, Col. Clark and Mr. Bothwell appear to have about covered the ground. Although I have not given the subject any attention, yet I presume that I should have discussed the very points made here by these gentlemen to-night. I will, however, have something to say upon that subject to-morrow. I know it is too late now to take up that question. I do not want to make a speech to-night and another on the same subject to-morrow morning.

I want to say, Mr. Chairman, that I have been very much pleased to see the lively interest manifested by the citizens of Fayette. We appreciate the nice place you have given us for holding our meetings and the welcome you have given your visitors. I think we are all pleased that the selection of the place of meeting was made here at Fayette.

Mr. Codding—Ladies and gentlemen, we thank you very much for the kind attention of this large audience and hope you will turn out in the following meetings.

Adjourned.

"On June 1, 1900, the number of horses in the State of Missouri as shown by the returns of the assessors was 822,038, valued by the assessors at $22.80 per head or a total of $18,745,935. The actual cash value of the horses of the State is probably more than $60,000,000. The number of mules 219,264, valued by the assessors at $6,011,921 or an actual cash value of not less than $20,000,000."

Missouri Improved Live Stock Breeders' Association.

Fayette, Mo., Thursday December 13.

Reported by Miss Snowdon Willis.

THE STATE FAIR AS AN EDUCATIONAL FACTOR.

By Hon. Norman J. Colman, St. Louis, Mo.

Mr. Chairman, Ladies and Gentlemen:—I am laboring under considerable embarassment here this morning, as my subject was assigned without consulting me, and was very fully discussed last night. Mr. Clark made a very interesting talk on the very topic which was assigned me, the Missouri State Fair: what has been accomplished and what remains to make it a success. I do not like to thresh over old straw and hence, as many here heard that talk and likewise heard a very interesting paper on that subject written by Mr. Bothwell, of Sedalia, I have concluded that as Mr. Sotham is not present, and was to have the subject of "The Educational Features of a State Fair and its Advantages to the Farmer and Improved Stock Breeder," to confine my remarks to that topic. In fact what I say is what we might consider a social talk. You know the Indians used to have what they called their talks when they gathered around the campfire and smoked their pipes of peace, and I am here to talk to you upon the Missouri State Fair. I have the honor of having been elected president of that institution, without consultation on my part, and I feel a good deal of interest in its success.

I should do injustice to my feelings if I did not thank the State Grange, its members, both sisters and brothers, for adjourning their meeting to listen to what I may have to say on this subject. I appreciate the compliment more than words can express. It is only in keeping with

what the Grange is always striving to do, and what it has always striven to do. If there is any topic which is near to the patrons of husbandry—to the grangers as we call them—it is the cause of education, the social, intellectual and moral elevation and development of the farming classes, and they are always ready to lend their ear and their support to anything which is calculated to bring about such results.

Now this matter of education is not generally understood, as in the popular mind it has heretofore been considered book learning, simply book learning. When a man has been graduated from college he is supposed to be educated. But that interpretation is not, in late years, being acquiesced in. There are men of very broad knowledge, very intellectual, progressive men, men who have filled the very highest stations of life, whose school education ended in the log school house. The history of our country is full of instances of this kind. Andrew Johnson worked as a tailor upon the bench six years before his wife taught him his letters. The parents of Millard Fillmore were so poor that they could only provide a sugar trough, cut out of a tree and used to catch the maple sap in, for a cradle in which to rock the future President. Andrew Jackson was the son of a very poor widow. In his early life he struggled with poverty. Grover Cleveland's father, whom I knew very well was a Presbyterian preacher, living very economically upon a salary of two hundred and fifty or three hundred dollars a year, and his son in his early years was a teacher of the blind. I bring forward these instances to show that college education is not everything; that business education, a knowledge of the world, a knowledge of one's own pursuit, this mixing up and rubbing against one another, comparing notes and discussing questions, we may meet to discuss, is a part of education and a very important part, and he who neglects this part of his education is a failure, and a dead failure. How often do we hear of graduates of our colleges starving, unqualified to do any business, unable to make even a living because they have book learning only, without any business qualifications and have not a knowledge of the world. All that they know is what they have read in past history. They are unfamiliar with what is going on at the present time.

I claim, and shall claim in the little talk that I may make to you to-day, that a State Fair, where people can meet together, where they can see possibilities, resources and productions of the great State in which

they reside, is an important educational factor. Where a person knows simply what he has learned from books, he is generally ignorant, when it comes to a knowledge of his State, of its conditions and what may tend to its proper welfare, and in this, the Fair is to be a feature and should be a prominent feature in education. Our education should be such as to make us familiar with what is going on in our own State, what we have here at home, among our own people, our own friends, our own associates. Children in our schools ponder over geography year after year and are trying to learn the names of rivers in Africa and of towns in Asia and in the various parts of Europe; but when we come to our own State, we know very little about it, and I am glad to know that an earnest effort is being made in this State, and throughout the United States to change the curriculum of our common schools.

Farmers' boys should be taught the elementary principles of agriculture. It is better for them to pore over these, than it is to be learning something in books about other countries, when they are ignorant of the very rudiments which are required to succeed in their own profession, in their own calling, which calling, as you all know feeds all, supports all, maintains our manufactures, our commerce and has built up this country to what it is. Why, if this land had been poor in agricultural resources, we would not have had such a country as we have to-day. It is agriculture that makes great nations. It has made every railroad in this grand country of ours. It has built every town and every city on this continent. Our forefathers went to work and hewed down the forests, raised their wheat and tobacco, rye and provisions and sold them; they gave employment to other industries, and it is agriculture that has built up this country. There is no calling that could exist without agriculture, without the labor of the husbandman. If a farmer draws from mother earth fifty or a hundred or a thousand dollars in the sales of cattle, horses, mules, sheep, wool or butter, cheese or anything that can be raised, he has added just so much wealth to this country. He has taken it from the soil. He has been a manufacturer. He has manufactured his wheat and his oats, his corn and his cattle, his sheep and his hogs just as much so as the cotton manufacturer has his calico, or any other manufacturer the product of his factory; and he is entitled to just as much protection; and let me say here in an undertone, he ought not to be robbed by the other classes who have high protection in order to make

them rich. This being the case, I say it is incumbent upon the farmer to understand his profession, to know what his State, what his nation can do. He can see the results of an improper system of agriculture in other countries.

Look to the once happy land of Canaan, once teeming with its products, where every farmer could sit under his own vine and fig tree. What is the present condition of that fair land that once flowed with milk and honey, that had its flocks and herds upon every hill and in every valley, where there were smiling vineyards to be found on every side? Why, it has simply been ruined and its soil exhausted and now but a few half starved goat herders are there. The ruin that came to Judea, Syria or any of those nations came through an improper system of agriculture; and we can right here at home see how by the same fault the soil of some of the older States has been exhausted. Look at Virginia, the mother of states and of statesmen. Go over her farming regions and you will find the soil has been completely exhausted by the raising of wheat as long as it could be produced; by growing tobacco as long as it would yield profitable crops, and likewise with other crops, thus exhausting the soil by an unintelligent and improvident system of cultivation. It is important if we love our children and have proper regard for the rights of their children's children that we do not leave our soil in an impoverished condition here in Missouri or in any other state of the Union. Go to the New England states and you will find the same results there. I have traveled from Boston to Bar Harbor, Maine, and found the land growing in shrubs and trees, deserted farms, so called, that had been abandoned by farmers to such an extent that state commissioners have been appointed to re-people them. Now then it is better for our children to know something about the rudiments of agriculture, the elementary principles of it, and that they should be taught this in our common schools.

This is a part of education, and I claim that the State Fair is an important factor because it gives us object lessons. If properly managed and manned, having a capable head for each department to display the products of the orchard, the vineyard, the garden; to exhibit in the stock yards the different breeds of cattle; to show the horses, the ponderous draft horse, the high-headed coach horse, the trotting horse; to present the different classes of sheep and hogs with other farm products, it becomes a

great school of instruction, and is working hand in hand with our other educational institutions; with the State University, which is improving and increasing with almost unparalleled pace and at no distant day will be one of the most important institutions that any state can boast of in the United States.

This matter of object lessons, ladies and gentlemen, is not a new feature with me. I know how people learn, and I know that you have to see men, and talk with them to become intelligent. The misfortune is that all are anxious to see, but few are anxious to hear. Why every seat in this hall, should be filled, and this hall should not be able to hold the people who should be here at this meeting of the Improved Live Stock Breeders' Association. If we had a display here worthy of the great State of Missouri, where there would be object lessons for the eyes, instead of being out on their farms to-day, the people would be here to see the displays of cattle, horses, sheep, swine and poultry and other farm products. But they are not here. They are at home on their farms, for they think they can not spend time to discuss these questions or hear them discussed. I say the Fair is an educational factor, and as such has the friendship and needs the support and the indorsement of the people of Missouri and all the patrons of husbandry of Missouri, for it is working hand in hand with them to educate and to elevate and to properly qualify them to carry on farming in an enlightened way.

I am aware that there are certain people who think that there are certain things done at the fair which detract from it, in the matter of amusements, for instance. But the amusement feature is a necessary part of every state fair. Any state fair that has not utilized the amusement feature has proved a failure. It is the great contests of speed which draw to cities like Springfield, Indianapolis, St. Paul and a great many other cities that I might name, fifty, sixty, eighty or a hundred thousand people. They have to pay their entrance fees and help to support the fair, and this amusement feature properly conducted, with the gambling feature eliminated, is one of the elements of success in the management of a fair.

I have had a good deal of experience in fairs. I know their value. I issued the first call for the St. Louis Fair, was its Secretary at its first meeting. I know what that has done. Why, do you know that it has distributed hundreds of thousands of dollars among the breeders and

farmers of Missouri. I was for nearly twenty years one of its directors. We gave forty thousand dollars a year in premiums and finally advanced year by year until we distributed eighty thousand dollars in premiums, in a single year, and this institution was a school of instruction in St. Louis in its early days. You who have been there—the farmers who have been there, have had a school there worth millions of dollars. They came there from all sections of the great Mississippi Valley and they saw there the mowing machines, the reapers and binders, the threshing machines, and other machines and all those things which farmers need to lighten their labors, they found these farm implements there and saw them in practical operation. Do you tell me such schools are not interesting and instructive? I tell you they are needed object lessons, and if we have a State Fair, as we shall have at Sedalia, there will the farmers of this great State assemble to see what Missouri can do, to see her displays in every department of industrial life. There will be a place for your sons and daughters to meet. There will be features worth carrying home in your memories.

The value and importance of object lessons is shown in all of our states, in connection with our agricultural colleges and experiment stations where practical lessons in farm management are taught. These experiments should be made so that farmers and farmers' sons, especially, who attend the agricultural college can get a practical education as well as book learning. After I had been appointed United States Commissioner of Agriculture, I had not been in my seat sixty days before I issued a call to every agricultural college in the United States to send its representative to meet at Washington for the purpose of taking into consideration the establishment of an experiment station at every agricultural college in the Union. This State was represented by Col. Switzler and Prof. Sanborn at that first meeting. I was honored by being made the presiding officer at that meeting. A committee was appointed to draft a bill providing for the establishment of the experiment stations. I was placed upon that committee, and after long labor, we perfected a bill establising an experiment station in every state and territory in the United States. After we had perfected that bill, a copy was handed to Congressman W. H. Hatch who championed it through the House, and to Senator Morrill who championed it in the Senate, and that bill became a law. I felt the need of object lessons in educational work, such as we

have in all our experiment stations and at our fairs to-day. The result of the calling of that convention of agricultural colleges was the establishment of these experiment stations all over the United States. I did not stop there, but established the Division of Experiment Stations in the Agricultural Department and placed at its head Prof. Atwater, to collect what was going on all over the United States in these experiment stations and put into the bulletins to be distributed to the farmers of the Union. I make this statement to show that I have all my life believed that the way to reach the farmers is not through books only. I tell you they are hard to reach, my brothers, you know how hard they have been to reach, and many of you know how long I have been dealing with them. As long ago as 1855, in this very town, I was addressing the farmers on the subject of agriculture, more than forty-five years ago. I likewise spoke in two or three other places in this county. I think Glasgow was one of them. The farmers are hard to reach, and if the learning they obtain must be gotten from books, ninety per cent of them will never be reached. We can reach them through their eyes, get them to mix up with the fairs, and in that way we can do a vast amount of good, and for that reason I am in favor of the Missouri State Fair.

I would go further than this, if I could have the management of that fair. I would not only have the children out, that they might see what is going on at the State Fair, might learn what Missouri is producing, might observe its possibilities, but I would try to have the teachers there, have the teachers from the various parts of the State come and see what the State in which they live produces. These teachers could take home with them many valuable lessons and could afterwards impart much useful information.

Having a State Fair already on its feet, the question now is what are the farmers of the State going to do in regard to it. Is there no State Fair spirit among the farmers of Missouri? In this imperial State of the Union are we always to remain in the shadow? Shall such states as Iowa, Illinois, Wisconsin, Minnesota, Indiana and Ohio and all these other great states have great state fairs to help them educate their people, and Missouri be in the background? Is there no pride among the people of Missouri to have their State stand as high as any other state in the Union? If there is any such pride, the time to manifest it is right now. We have a State Fair organized, a fair that will starve and die of inani-

tion unless an appropriation is made by the General Assembly to put it in as good condition as the state fairs of our neighboring states. Now I put this question to every lover of the State of Missouri, to every lover of its development, to every lover of its honor, its glory, its crowning glory, because I consider that the State Fair properly nutured and supported and sustained will be the crowning feature of all our great educational institutions in the State of Missouri.

If then you feel as I do the importance of making this fair an educational factor, if you wish an appropriation to be made for the display of our great mineral wealth, of our horticultural wealth, of the products of our soils, of our breeds of cattle, horses, sheep and swine, now is the time for you to take action. We hold that no state in the Union can make such displays as the State of Missouri. In all of our contests with other states we have borne off the palm. Through their enterprise and labor, without a dollar of appropriation, see what our friends here in this State did. Our Secretary of the State Board of Agriculture, Col. Rippey, Col. Waters and others, see what a display they made at Omaha at that grand exposition! We took away more premiums than any four or five other states, and when we came to have a display of the victorious herds, my recollection is that the first herd, the second herd, the third herd, the fourth herd, and probably the fifth, in that grand cavalcade, were herds from the grand old State of Missouri. (Applause.) Other breeders had to trail behind Missouri then and there, and it was the same way at the Chicago Exposition, though not so strikingly. And when it came to the World's Fair at Paris in 1889, the duty of making the agricultural display at which, Congress put on me, throwing upon me the burden without additional compensation, putting in my hands a large amount of money, we were victorious over other nations where our products came in competition. I have forgotten how many medals—I think about forty—were awarded to us by the Paris Exposition; there was a display which I have never seen equalled anywhere.

This is an age of expositions. We are going to have the greatest exposition that the sun ever shone upon in St. Louis in 1903. (Applause.) I visited the first national exposition we had at the centennial at Philadelphia. I visited the one across the waters at Paris, the one at Chicago, the one at Omaha; I saw all of these expositions in our own time. I did not visit the ones at New Orleans or Atlanta or Nashville,

but I simply refer to these to show that we are in an age of expositions, that the great advantages of expositions are appreciated by the public, and that if Missouri people keep up with the times, they should have an exhibition at her State Fair that would be a feeder and a helper to that great exposition which will eclipse all others, to be held in St. Louis in 1903.

I promised not to speak over an hour. My heart is in this matter, my friends, and I could talk to you all day about the advantages and importance of this State Fair as an educational factor. There is one advantage that I now think of, which our sisters and brothers of the Grange should appreciate most thoroughly. They are now having at our fairs in Illinois, Ohio and Indiana, a woman's department, organized and equipped especially for the women, and the best teachers in Domestic Science that can be procured in the United States come and locate upon the fair grounds in the woman's department for the week. A large building is entirely under their management from which men are entirely excluded. There are sleeping apartments, rest rooms, and all conveniences to render the wives, mothers and daughters in attendance comfortable. There is also a department in cookery. This building is filled all the time and the most beneficent results are obtained from it. While I am at the head of the Missouri State Fair I am going to use my influence to give just as much attention to the ladies' wants as to what the men may need. (Applause.) I will tell you, ladies are very important factors in a man's life. He can not get along without them, and the higher they are in the state of development, intellectually, morally, socially, in being qualified to discharge their important functions as mothers, and wives and sisters, so much the better will we be, so much the more will we enjoy the life which we are living here.

I may not live, my friends, to see these glorious results achieved in Missouri. The sun of my life is nearly set. The frost of seventy-three winters have whitened my hair. I would like to see this crowning result —a State Fair in Missouri unsurpassed by any other in the United States. Then I think I could willingly withdraw from the scenes and trials of this life, to take part in the life which is to come.

I have seen great development in the last fifty years in Missouri and believe that there will be greater in the next fifty years. Many of us think we have already reached our limit, but we are just simply upon

the threshhold of discoveries. New discoveries, new inventions are all the time being made, and our children and our children's children will see an advancement of which we now have no conception.

And in parting, as this may be the last time that I may ever have an opportunity of speaking to my sister and brother grangers, I want to say that I bid them God speed in the good work in which they are engaged. There has never been any other organization for the farmer that compares with the Grange in its educational, social, moral, and intellectual features. (Applause.) There is no politics or religion in it. It has but one object and that is the elevation of the great farming classes. But for bickerings (and let me say, in my estimation, politics) it would be one of the moving influences in this great State to-day. It was that which destroyed it in this State. I opposed any politics in its organization, knowing what must be the result. Here at one time we had in the State of Missouri some three thousand granges and more than one hundred thousand members of the best men and women in the State of Missouri. I may say I was the first one to get up an organization here, for I myself paid Mr. Kelly, one of the founders of the Grange, to come here and teach us how to organize granges.

And this, my brothers and sisters, reminds me that the man who had the leading part, who did more than any other patron of husbandry in the United States to prepare the lectures and to perfect the work of the order was William Saunders of Washington, who was the superintendent of the gardens and grounds during the four years that I was at the head of the Department of Agriculture. I frequently advised with him about it. I was honored with holding the office as master of the Potomac Grange during the four years that I was in Washington. I read a few days ago that at last William Saunders had been called to his long home, and the order of the Patrons of Husbandry had met a loss which they can never replace.

Here is a feature I can hardly understand. The farmers of the East were afraid of the order, and it was not until long after its membership extended, as it were, like a prairie fire all over Missouri, all over Illinois, Minnesota, Iowa, Kansas and Nebraska, that the flames spread to the East. But it got there and it stays there. There is field enough to support it, intellectual, social and business force to keep it in existence, and the Grange is the controlling influence in legislation now in these

states. More than half of the members of the legislatures in the eastern states are patrons of husbandry. They have fought the oleomargarine fraud and other vices and vicious legislation there to a finish, and as you know who are posted in this order, instead of dying, they are increasing in growth and in vigor and influence continually. It was their influence that carried through the Grout bill in Congress and I was very sorry to see that one of the senators from our own State was opposing that bill. But I believe that the influence of the patrons of husbandry will save you from that ruinous product oleomargarine. It will save you from that unfair competition, not because we are afraid of oleomargarine; we are not when it wears its own garb, for butter is always known by its yellow color and oleomargarine is white as the snow unless it is colored to deceive. The tax on pure oleo has been reduced to one-fourth cent a pound. I have no objection to that; but when colored to deceive the buyer, we have to say, you must pay ten cents additional tax. When I visited the various cities of Europe I found colored oleo selling for butter, displacing the sale of so much of the butter of this country. When colored it is a counterfeit article. I want to know, when I put anything in my stomach, what it is and I do not want to be deceived. This question is an important one to the farmers. We have an anti-oleomargarine law on our statute books, but some of our judges and prosecuting attorneys are so much under the influence of the beef barons of Kansas City and Chicago that they will beat us every time that a case is brought up there if it is possible to do it.

But my time has expired. I thank you, ladies and gentlemen for the kind attention that you have given my remarks. (Applause.)

"The agricultural interests are most important. They represent one-half the population of the United States, one-half the capital, and about all the patriotism and feeling there is. Whenever a situation comes up where the integrity of the country is at stake the agricultural interests rise up in a body and sweep the obstacle aside. It is the man who owns the land, the area from which we live, who is the strongest factor in affairs."—J. J. Hill, President Great Northern R. R.

EXPERIMENTS IN WINTERING AND FATTENING STEERS.

By H. J. WATERS, Dean Agricultural College, Columbia, Mo.

THE VALUE OF A BALANCED RATION.

This matter of a balanced ration has been under consideration for many years, during which time it has been discussed in our agricultural papers, in the farmers' institutes and in bulletins of the Experiment Stations to such an extent that the farmers of the class here represented fully appreciate its importance and well understand the principles involved. So if I were to spend the time allotted to me in explaining all these things and in pointing out why a properly balanced ration will make a larger gain than one not properly balanced, you would say at the close, if you were entirely frank, that you understand this and grant all that has been said, but the important point is how to bring this about; what shall we use to balance this ration? When it is pointed out that the principal farm crops, such as corn, corn fodder, millet, sorghum, timothy hay, wheat and oat straw, when used either singly or in combination form an unbalanced ration, or one that is deficient in muscle making material, and that it is essential to add something else to such feed to promote the best and most economical growth, the answer would naturally be: what shall it be? If I should suggest that linseed meal, cotton seed meal, ship stuff and feeds of that kind be purchased, you would immediately ask if these materials are not so expensive that the extra gain obtained would not meet the increased cost with the ordinary class of stock. I am not addressing my remarks to the breeder of fine stock just at this moment, but to those who handle stock of the ordinary grade. It would be necessary to say that under ordinary circumstances it would not pay to use these expensive feeds. Fortunately, however, it is possible to remedy this difficulty to a large degree without the purchase of such feeds and without materially changing our system of farming by giving more attention to some crops with which you are already more or less familiar, but do not fully appreciate. For example, we do not fully appreciate the feeding value

of clover hay. We are appreciating the value of this plant in improving our land, but we have not come to fully realize the superiority of this hay over timothy hay in the feeding of young stock. We appreciate the value of the cow pea as a soil renovator, but we do not appreciate the superiority of this hay over timothy and other such hays in making growth and gain and in putting finish and bloom on beef cattle. If we examine the tables prepared for us by the chemist showing the proportion of muscle making and fat forming ingredients contained in this class of feeds, we would find that clover hay will go a long ways toward balancing such feeds as corn and corn fodder. If we examine the proportion of these ingredients in cow pea hay we will find that this hay will go almost as far in this direction as wheat bran. I do not mean to say the cow pea hay is as valuable as the bran, ton for ton, for it is not quite so digestible, but as far as a balancing ration is concerned, it serves a valuable purpose.

This is not so only in theory, but a considerable number of dairymen in this and other states have found that by the use of this hay they are able to greatly reduce and in many instances entirely dispense with the large bill for bran, etc., which they formerly had. One of the best dairymen in Boone county has not purchased a single ton of bran in the last three years and tells me that he has produced more butter per cow in these years than ever before and grows all the feed on his farm, viz.: corn, corn fodder and cow pea hay. You are, however, more interested in the results of careful feeding tests along this line. I therefore invite your attention to the following table giving a summary of some of the feeding trials we have made, and will then dismiss the subject to take up some other phases of feeding.

These results were obtained at the Experiment Station last winter with two-year-old steers, in which an attempt was made to compare several different feeds, which furnished rations balanced differently.

Comparison of Different Rations for Fattening Steers in Winter.

December 16, 1899—*April* 14, 1900—119 *days*—4 *Steers in each lot.*

Lot.	Corn bushels.	Cotton seed meal, pounds.	Timothy hay, pounds.	Cow pea hay, pounds.	Corn fodder, pounds.	Clover hay, pounds.	Total gain, pounds.	Daily gain, pounds.
I	166		3813				802	1.69
II	139	2600	4147				1015	2.13
III	188			3662			1257	2.64
IV	185				1889	1626	917	1.94

The cattle comprising each lot were as nearly uniform in breeding and quality as it was possible to get them and all were fed under precisely the same conditions, at the same time and treated in all respects alike except that the feed was different for each group, as is shown in the table.

It will perhaps facilitate the study of these results somewhat if we compare the gain of each bunch of steers with the bunch that was fed corn and timothy hay. This is a standard ration the country over for fattening cattle, and for this reason it is selected as the standard in these experiments.

(1) It will be observed that the four steers getting all the corn and timothy hay they would eat, gained 802 pounds in 119 days, or at the rate of 1.69 pounds per day per steer.

(2) That when for one-fourth of this corn was substituted an equal weight of cotton seed meal, so that this lot was fed all they would eat of the mixture of three-fourths corn and one-fourth cotton seed meal, and all the timothy hay they wanted, the gain in the same length of time was 1015 pounds, or at the average rate of 2.13 pounds per day. A comparison of the profits from these two lots of steers will not be discussed at this moment, nor the circumstances under which we have found, in five years experimenting, it to be profitable to feed cotton seed meal, but will reserve this phase of the subject for another time.

(3) A third bunch of steers full fed on corn and cow pea hay ate rather more corn in the time they were on experiment than did the other lots and gained 1257 pounds in 119 days, or at an average rate of 2.64 pounds per day instead of 802 pounds or 1.69 per day, as was the case with those getting corn and timothy hay. Here then is an increased

gain of 455 pounds for four steers, or 114 pounds per steer in 119 days, or practically a pound per day, the large part of which must be fairly attributed to the superior feeding value of cow pea hay as compared with timothy.

(4) Not only do we have to credit to cow pea hay this increased gain, but the steers of this lot carried to market a far better coat, much more finish, a finer bloom and would have readily out-sold any other bunch in the experiment.

Toward the close of the experiment I took the pains to have every feeder and stockman who visited the Station pass judgment upon the finish and bloom of each lot of steers on experiment before giving them any information as to how they had been fed. Of the twenty or thirty competent stockmen who passed judgment, every one without hesitation awarded the first place to the cow pea lot, the second in a majority of cases to the lot receiving cotton seed meal and the third to the bunch on clover hay and corn fodder. This is universally true. Such materials as cotton seed meal, linseed meal, wheat bran, clover hay and cow pea hay may be depended upon to give to the coat of a fat steer an extra gloss that will materially add to his selling qualities on the market.

A BALANCED RATION FOR WINTERING STEERS.

Necessarily the finishing of cattle for market will in every community be left to a comparatively few men and the discussions thus far have not the general application that will be found in the results of some experiments I will now present, for practically every farmer winters some cattle and will be much interested in any plan that is likely to increase the gains or reduce the expense.

I therefore call your attention to this table summarizing the results of last winter's work at the Station with a bunch of yearlings which were not full fed, but merely roughed strong, so as to make a fair growth and go on grass in good, thrifty condition. All the lots shown here as getting grain were fed four pounds or about a half gallon of corn per day and all the roughness they would eat of the kinds indicated.

EXPERIMENTS WITH DIFFERENT METHODS OF WINTERING STEERS.

From Dec. 29, '99—April 9, '00—101 days.

Lot.	Corn, bushels.	Timothy hay, pounds.	Clover hay, pounds.	Corn stover, pounds.	Cow pea hay, pounds.	Total gain, pounds.
II	28	6536	....	....	....	260
IV	28	....	3593	3631	....	356
VI	28	....	....	....	7757	624
VII	.....	....	.....	....	8048	228

Here again we use corn and timothy hay as the standard ration and will compare the results from all others with those obtained from it.

The table shows:

(1) That the four steers in lot II ate in 101 days 28 bushels of corn and 6539 pounds of timothy hay and gained 260 pounds.

(2) That a bunch of similar steers eating the same amount of corn and half clover hay and half corn fodder for roughness gained in the same time 356 pounds or nearly 100 pounds more.

It is proper to say here that this agrees in general with the results of a number of similar trials that we have made in other years; that is that a combination of clover hay and corn fodder may be depended upon to make as much gain as an equal weight of timothy hay. It is of little consequence which horn of the dilema you take. If you are unwilling to concede that corn fodder has any feeding value, then you must admit that clover hay is more than twice as valuable as timothy, for a ton of clover and a ton of corn fodder according to these results show more gain than two tons of timothy. If this proposition is not considered sound and that clover has no more value as a feed than timothy as is maintained by some, you must then concede to corn fodder the same value as timothy, ton for ton. Neither proposition is correct, but in either case you are erring on the right side, for if you unduly exalt clover hay you will be particular to grow more of it, and in so doing will provide one of the best feeds for your stock, besides improving your land, and if you err on the side of corn fodder, you will be more careful to save it than has been the custom with us in Missouri in past years.

(3) Another bunch of steers getting 28 bushels of corn and all the cow pea hay they would eat, gained in 101 days 624 pounds, or more than double the gain obtained from the same amount of corn, and practi-

cally an equal quantity of timothy. Six hundred and twenty-four pounds with cow pea hay for roughness and two hundred and sixty pounds with timothy! Bear these figures in mind and you will more fully appreciate the profit in properly balancing your ration for growing cattle.

(4) A fourth lot which was wintered on cow pea hay alone without any grain whatever, gained 228 pounds as compared with 260 pounds for the lot that had 28 bushels of corn and all the timothy hay they would eat. This touches upon a very interesting point in wintering this class of cattle, viz.: whether, on the whole, it is more profitable to use little or no corn and be content with a small gain, made chiefly from cheap roughness and depend upon the following summer's grazing for the bulk of the gain, or whether it will pay to give a moderate amount of corn with the roughness and make a larger gain. While this experiment does not begin to settle this question, it throws some light on it. Observe that the lot eating 28 bushels of corn and 7757 pounds of cow pea hay gained 624 pounds while the lot on pea hay alone ate 8048 pounds and gained 228 pounds, a difference of 396 pounds, which is fairly attributed to the corn. Rating this gain worth five cents per pound, the price offered for the steers at grass, we have 396 pounds extra gain at five cents—$19.80—70 cents per bushel for the 28 bushels of corn required to produce it.

GROWTH AND NOT FAT REQUIRED IN YOUNG CATTLE.

It is proper at this point to observe that cattle of this age should be made to grow rather than fatten, that the gain in weight should be of muscle and bone rather than tallow; if they are to be run on grass alone the following season, and unless they are to be pushed for the market. As would be expected, we found this fall when we weighed these cattle off grass, those steers which went to pasture in only thrifty condition showed more gain than did the bunches that carried more fat to pasture in the spring. This point is too often lost sight of by those who take special pride in the condition of their stock. It is safe to assert, however, that cattle may be sent to pasture in the spring carrying much better flesh from such feeds as oats, bran, clover or cow peas in connection with corn, than can those which have been fed on timothy, corn fodder, sorghum, millet, etc., in connection with corn, for the well known reason

that the oats, clover, etc., promote growth rather than fat and give to the animal a suitable frame upon which to build on grass. These remarks are not to be construed as favoring keeping stock thin or being satisfied with slow gains, but that the gains at this stage of the animal's life be made up as far as possible of muscle and bone instead of fat as is too often the case.

SELLING CLOVER HAY IS BAD POLICY.

I do not know how common the practice of selling clover hay is among you but in our portion of the State we have very little trouble in buying this clover hay at a dollar to a dollar and a half a ton, less than good timothy hay. Sometimes the men have not good timothy hay to sell, but have good clover and if they want to sell some hay they will keep the timothy to feed and sell the clover. These men do not fully appreciate the superior feeding value of the clover, nor do they realize that in a ton of clover they sell nearly twice as much soil fertility as when a like amount of timothy is sold.

INFLUENCE OF SHELTER ON GAIN OF STEERS IN WINTER.

Nov. 1, 97—Feb. 13, '98—105 days—5 steers in each lot.

Trial I.

	Corn eaten, bushels.	Hay eaten, tons.	Total gain, pounds.	Gain per day, pounds.
I Barn	172	2.25	772.5	1.47
II Shed	186.5	2.5	903	1.72

Nov. 2, '98—Feb. 8, '99—109 days—5 steers in each lot.

Trial II.

I Barn	190.5	2.75	1010	1.85
II Shed	209.5	2.2	1255	2.30
III Lot	190.5	2.75	1250	2.29

Dec. 16, '99—March 26, '00—100 days—4 steers in each lot.

Trial III.

I Barn	140	1.4	669	1.67
II Shed	139	1.6	677	1.69
III Lot	133	1.4	711	1.78

The steers sheltered in the barn were confined in a reasonably tight but well ventilated frame building with plank floor and were allowed to run loose. They were kept well bedded. During pleasant weather they had the run of a well drained lot from about eight o'clock in the morning until four in the afternoon and were turned into the lot for water every day, but in stormy weather were put back as soon as they had finished drinking in the forenoon and afternoon. The shed was of the ordinary form closed on the north, east and west, but open to the south and with dirt floor which was bedded to keep it as dry as possible. This shed opened into a lot of about the same size and aspect as the one adjoining the barn in which the other steers were confined. They were fed and watered in the shed but had free access to the lot at all times and in all kinds of weather.

In the first trial, the winter of 1897 and 1898 the steers in the barn ate considerably less grain and slightly less hay than those in the open shed and the gain was decidedly less. In short the open shed steers ate 14.5 bushels of corn and one-half a ton of hay more than the barn steers in 105 days and gained 130.5 pounds more, showing that they made a better use of their feed when not too warmly housed. The daily gain in the barn was approximately 1.5 pounds while those in the open shed gained practically 1.75 pounds.

This was so contrary to our expectations that it was decided to continue the experiment through the next winter and to add a third bunch of steers which should be confined in an open lot of about the size of the other pens, having no grass and no shelter of any sort. Some corn stalks were thrown in one corner of the pen to give them a dry place on which to lie.

This experiment lasted from November 2 to February 8—a period of 109 days with essentially the same result, although the difference in the amount eaten by the different bunch of steers was not so marked as before. The daily gain of each was:

In barn—1.85 pounds.

In open shed—2.30 pounds.

In open lot—2.29 pounds.

The results again indicate that the cattle kept in the barn were overhoused, although it should be remembered that the barn was well ventilated and the cattle had the freedom of one side, were dehorned and had

been accustomed to shelter and handling, having been used for some experiments in wintering cattle the year before.

A third trial in the winter of 1899 and 1900 was made with four steers in each lot instead of five, as in the other experiments, and covered the period from December 16, 1899, to March 26, 1900—100 days.

The steers in the barn ate slightly more grain than either of the others, although the difference in this respect between the lots was so small as to be practically disregarded.

The daily gains are:

In barn—1.67 pounds.

In open shed—1.69 pounds.

In open lot—1.78 pounds.

Thus it appears that all the trials gave the same general result. It is needless to say that we were not prepared for quite this outcome. While we were fully convinced that cattle of this class accustomed to outdoor life could be easily overhoused when on full feed of such heating and fattening foods as corn and timothy hay, especially after they had laid on considerable fat; it was reasonable to suppose that a more economical gain and even more rapid gain would be obtained when they were sheltered against the storms.

While the difference between the gains of the bunches in the open shed and the open lot do not indicate a large advantage in favor of the open shed, yet from every point of view it seems fair to say that where much winter feeding is to be done, it will be profitable to provide suitable shelter for the cattle, the feed and the manure, and particularly to give the cattle a dry place to lie. From these experiments it does not appear to be necessary or profitable to attempt to make such quarters warm.

THE PRACTICAL FEEDER'S EXPERIENCE.

Not satisfied with the results of these experiments, notwithstanding the fact that we were particularly careful to have the quality of each bunch of cattle as uniform as possible and that all of the conditions excepting the shelter were identical with each bunch, I sent an inquiry to a few thousand of our cattle feeders in Missouri, Illinois, Iowa and Nebraska, asking for their experience along some of these lines, and among other questions I asked:

First. How many years have you been in the business?

Second. How many steers have you fed and marketed during your experience?

The results received up to the time I left the office represented some thirteen hundred Missouri feeders, with an average experience of about twenty years and representing a total number of over a million and a quarter of steers that these men had fed and marketed during their lives; and one question that I asked them was:

What form of shelter do you prefer for winter feeding?

Summarizing the results we find that 663 feeders expressed an opinion on this question with the following result:

Barn preferred by 117 or 17.6 per cent of the whole.

Open shed preferred by 392 or 59.1 per cent of the whole.

Open lot or timber, etc., preferred by 154 or 23.2 per cent of the whole.

Many of those who preferred a barn described the kind of barn they used or preferred and it was really little more than a large open shed, but as they called it a barn I put it down that way. So the experience of these men seems to have been verified by the experiments already cited.

The Standard Cattle Company of Ames, Nebraska, with plenty of capital behind it and in the feeding business for the largest profits regardless of cost of equipment, started out some twelve or fourteen years ago to feed cattle. In the last twelve years they have fed and marketed approximately seventy-five thousand steers. The first thing they did, the manager wrote me, was to build a barn that would hold three thousand steers. They kept careful account of each item of expense and lost money. The next winter they filled the barn again. They did not understand where the trouble was, but they put some of the steers out of doors, having more than the barn would hold, expecting to lose heavily on that bunch of cattle, and the manager to save himself kept a separate account of the two bunches of cattle and he found that they made money on those out of doors and lost on those in the barn. They were tying up ranch steers and the labor attached to cleaning out and bedding was to be added to the expense of that bunch of cattle. These were range cattle that had never been under roof before. At the end of the fourth year they abandoned the barn and up to this time they have never used it except as a hospital for sick animals and now they use it as a sheep feeding barn. They use wind breaks and open sheds.

It is well to emphasize the point that all these remarks apply strictly to cattle on full feed and not to young, thin animals or breeding cattle.

We carried on this same experiment for three years with yearlings one winter, feeding them on hay only and two winters on a small quantity of corn and what timothy hay they would eat. The result was altogether the other way. The bunch in the barn came out in the best condition by far, with a better coat, etc. It would be the same way with any other class of cattle if due care is taken not to over house and to keep their quarters well ventilated.

Discussion.

Mr Hariston—Have you ever conducted any experiments on baby beef?

Prof. Waters—I would say we have never made any direct experiments bearing on baby beef. This is an exceedingly difficult question to answer. It is getting on ground that is very debatable and there is much to be said on both sides. It will depend a great deal upon how a man is situated; but I take it that with cheap grass and comparatively cheap land, or with cheap feeders, that a man had better let the stock get a little larger and not undertake to make baby beef, for the reason that you can make a great many pounds of that steer on grass alone and if you will stop to figure a moment you will see that there is nothing to compare with grass in cheapness of gain. Good grass costs about seventy cents a month. In that time the steer would gain 35 pounds (that is not a good gain but we will put it at 35 pounds) and your beef has cost you two cents a pound. Often the gain on grass will cost less than a cent and a half per pound and under especially favorable circumstances about a cent. Of course you can not make beef in the feed lot at two cents a pound. The fact is that you can lay up in that steer a profit up to the time that you put him on full feed and often-times while he is in the feed lot he is losing money, the last one or two hundred pounds you put on him costing more than it brings on the market. To make baby beef, strictly prime baby beef, you must use expensive feeds. You can not make it out of corn and timothy hay, etc., you must use oats and bran and splendid clover hay in addition to corn. You can not use enough cheap roughness. Then the misfortune of the transaction is when you

get your steers to market they sell as a rule from 25 to 50 cents per hundred less than equally good cattle of greater weight.

All of this is true despite the fact that you can put a pound of gain on a young animal cheaper than on an old animal, for you must make too much of that young animal's gain out of expensive feed, whereas you make a considerable part of the larger animal's gain out of cheap feed. A man in Illinois or Ohio, where land is high priced and grass is scarce and expensive and his grain is not materially more expensive than ours, can make baby beef profitably, whereas he might not be able to make export beef unless he can buy the feeders' cheap. I do not mean to say there are not times and circumstances under which baby beef is very profitable, but to make baby beef you must have a high class cattle. Plain cattle will not answer.

Mr. Hariston—Is there no medium ground between these two?

Prof. Waters—Yes; thirteen hundred to fourteen hundred pound steers.

Mr. Hariston—Take the class they make baby beef of, give it feed, roughness and grass, can't you get the same result with less grain and more grass and make more money?

Prof. Waters—You mean make him a thirteen or fourteen hundred pound steer, on a small amount of grain. I can answer that question in just a word. I asked the three thousand feeders the question, if fifteen or sixteen hundred pound steers had made them money, as a rule, in the last ten or fifteen years, and the majority of them said no. Many said yes, eighteen or twenty years ago. Again I asked what weight had yielded the most profit on the average and the figures ran around thirteen hundred and fifty pounds. I do not think the average will miss this more than twenty pounds. To see if these feeders had the right point of view, I addressed a letter to several of the leading commission firms of Chicago and St. Louis along the same line, and they answered that they were satisfied from observation and experience that the men who brought in well finished cattle weighing around thirteen hundred pounds, as a rule made more money than those who had heavier cattle. All this assumes equal finish for all weights.

Mr. ———Did you ever make any experiment with calves six months old and steers a year and a half old—about a difference of a year

in their ages—and notice the difference in feeding, the pounds gained and the cost of gain?

Prof. Waters—A six months old calf after he is weaned and well on feed will make appreciably cheaper gain than when he is a year and a half old. Now if you are using the same feed, then the cost of a pound of gain would be less, but the trouble is you are making that gain largely out of grain and high class roughness. If you made all the gain of the yearlings out of the same material and the two classes brought the same price per pound, then the calves would make the most money.

Mr. ——— What do you think of sowing oats and flax and using as a roughness instead of oil meal, and feeding hay, oats and flax together, mowing it like hay and using it as a roughness?

Prof. Waters—I have never had experience with it, but believe it would make excellent roughness.

Mr. —— I believe in a country where oats grow it is the cheapest. I think it might be well to raise some oats and flax and give it a test. It was suggested to me and I have tried it twice with good results.

Prof. Waters—They use a great deal of flax straw in the flax growing region. Of course the small quantity of flax with the seed would be better.

Mr. ——— Was the barn in which you made your experiments thoroughly ventilated so that the cattle could get all the fresh air they needed?

Prof. Waters—The barn was ventilated I think better than the average cattle barn would be. Besides it was not a barn that was difficult to ventilate and did not contain a very large number of cattle. The animals were let out during pleasant weather, but in stormy days we kept them up all the time except letting them out in the forenoon and afternoon to water.

Mr. ——— I was thinking of the reason for their not gaining. I knew they needed ventilation to be able to digest their feed and wondered if they got it.

Mr. ——— What do you think of feeding bran to cattle, that you are feeding corn? I have heard experienced feeders say that bran was not of much account with cattle feeding on corn.

Prof. Waters—It all depends upon the relative cost of bran and corn and what the cattle will bring. I take it that it is comparatively

seldom we can buy bran at such a figure as to make it profitable. But at the same time I am certain that a little bran along with corn will make a faster gain and will put on a better finish. It will pay to put into one bunch of cattle more expense than another, according to the money they will bring. Those who feed full on corn and cotton seed meal on grass in summer, find it, I am satisfied, a good deal more profitable to use a little bran, for, as they express it "a cooler."

Mr. ——— When I was feeding a lot of cattle I noticed that when I put the corn in the trough before I did the bran and ship stuff, the cattle would stand around the trough and lick at it and only a few of them would eat it, but as soon as I put in the bran they would all make a dive for it and never quit as long as there was bran to eat. I concluded that it was a pretty good thing to use bran.

Prof. Waters—It is good if the expense is not too much, that is the only drawback.

Mr. ——— Right along that line, is it not a fact that you can use these high priced feeds to finish up a bunch of cattle, because they will gain in that way where they would not make a gain without expensive feed?

Prof. Waters—Undoubtedly in the last thirty to sixty days it is profitable to put on a few more pounds as it will add a good deal to the value of the animal. You understand that a steer that ought to be made to weigh fourteen hundred pounds when properly finished, if sold at thirteen hundred pounds will bring from fifty to seventy-five cents less per hundred pounds than it should.

Mr. Boles—Would you advocate feeding grain alone without roughness?

Prof. Waters—That is a question that I am not prepared to answer. I have a decided opinion on it, but it is based on trying just one side of it. I do believe it is advisable to feed roughness. So confirmed am I in this view that I have come to the conclusion, after the most careful thought and inquiry that the most promising and profitable field for investigation in the fattening of steers for Missouri is the question of the best roughness to use. Corn and cow pea hay as we have already seen gave a greatly increased gain over corn and timothy hay. I discussed that awhile ago.

Mr. ——— What is the best roughness outside of blue grass?

Prof Waters—Green clover and timothy together are better than

blue grass; of the dry roughness, clover and cow pea hay. I would not limit cattle to any single roughness, no matter how good it might be. The ideal way to feed cattle in winter is to have them in an inclosure that is small enough so that they will not take an unnecessary amount of exercise and yet large enough so that they will not make it excessively muddy, with a straw stack to run to if possible, a rack full of clover and cow pea hay, or either, and corn, if you want full feed, and corn fodder once or twice a week, so that they may have a change of roughness, and so that corn fodder and straw will check the tendency of the corn and cow peas, especially the corn and clover to scour the animals. The only really expensive feed is the corn and clover hay or cow pea hay.

Mr. ——— How will the profits of full feeding of corn compare with feeding only a peck a day?

Prof. Waters—This will depend upon the condition of the cattle when they go to grass, how they have been fed and when you expect to put them on the market. With cattle that have been full fed for any length of time before grass, it is usually considered the best policy to full feed on grass or feed nearly full during May and the first half of June and full feed after that. If they are nearly ripe when grass comes and unless the state of the market is such as to warrant the risk and expense of carrying them through the summer, it will be best to push them right along and get them off before the hot weather and flies come.

On the other hand, with cattle that have been merely warmed in winter a peck a day on grass will be sufficient to make excellent gains through May and June, at least. This may be gradually raised through July and August, if the grass becomes indifferent and the flies bad and full feed to a finish in the fall. Inasmuch as grass is cheaper than grain, the larger the proportion of gain gotten from grass, the greater the profit. In this case the cattle could not have been gotten ready for the market before the heat and flies of summer at any rate.

Mr. ——— I feed on grass and the method of feeding does not bother me as much as flies.

Prof. Waters—We have tried remedies proposed on grass feeding. The operation is very simple except for the flies. I think that is the greatest drawback to the feeding operations and we have never yet found a really feasible, practical remedy.

Mr. ——— This year I used a spray pump and sprayed my cattle

with walnut leaves and pennyroyal for about three days in succession and the flies left. By keeping it up once a week I was not bothered with flies.

Prof. Waters—Fortunately your cattle were quiet enough to be handled in this way. There are numerous substances that are successful when sprayed on once or twice each week.

Mr. Hariston—Tell us how to grow the cow peas, how you sow them, the amount of seed per acre, etc.

Prof. Waters—In brief, we prepare the land as one would for corn and sow after corn planting time when the soil is warm. If sown earlier than this, weedy hay will likely result, as the weeds grow faster than the peas in cool, wet weather. We prefer to sow with a wheat drill at the rate of about one and a half bushels per acre. Set the drill so as to cover the peas at least two inches deep and deeper if the ground is dry. Let all hoes of the drill run so that the rows will be only eight inches apart. The peas can fight the weeds more successfully then than when the old method of stopping each alternate hoe of the drill is followed.

It is important to get the proper variety. For hog pasture I would recommend the Whippoorwill and the Black. For hay the Clay is the best variety for Central and Northern Missouri, all things considered, for the reason that it is very productive, has a rather fine stem which enables it to be cured into hay more readily than most others, and it holds its foliage well before and after cutting. Its chief disadvantage is that it does not produce seed this far north and one must buy southern grown seed each year. The Whippoorwill is generally recommended for the northern states because it matures rather early and produces a fair seed crop. But it is not a good hay variety and after trying it along with fifty or sixty other varieties for a number of years, I am fully convinced that except for hog pasture it is not a profitable variety. The Black is the best combination hog pasture and hay variety, and a good all around sort, although not so good for hay as the Clay.

For green manuring the Clay and Unknown or Wonderful are the sorts to be recommended.

They are harvested just as any other hay crop, being cut with an ordinary mower and cured and handled very much as you do clover. The vines are coarser than the clover plants and therefore somewhat

more difficult to cure, but they have the advantage of resisting the injury from rains to a surprising degree. In this respect they are quite like sorghum and appear to stand quite as much rain. It is usually considered best to commence cutting when the first pods begin to turn yellow on those varieties which seed here, or when the lower leaves of such a variety as the Clay begin to drop off. But in actual practice it is well to select as far as one can, a dry time, at the season of the year that you have leisure to handle them. Cut regardless of the stage of maturity. Allow them to cure as much as possible in the swath, and every clover and pea grower ought to own a hay tedder, turn them with a tedder if possible while the dew is on so as to prevent the loss of the leaves and either stack them or put them in the barn direct from the swath or put them in rather large shocks to complete the curing process, from which they may be stacked. Like clover it is necessary to cover the stacks with timothy or some such material to turn the water. The hay is fed in the same manner as other hay and is very valuable feed for all classes of stock. Even the hogs are very fond of the leaves and finer stems in winter. Many breeders of fine horses, particularly of running horses prize the hay very highly for their brood mares and weanlings. It is a fine feed for dairy cows and ewes that are nursing lambs.

We have for the past five years grown a crop of rye for winter and early spring pasture and a good crop of peas for hay each year on the same land with one breaking. After the peas are removed in the fall the ground is in almost ideal condition for rye or wheat, after the disc harrow has been run over it twice. Plowing at this time is unnecessary and really injurious to the rye or wheat. For several years we have grown good crops of wheat and cow peas on the same land, one season after another—breaking the ground after the wheat is removed for the peas.

A rotation in which you may be interested that we have just started is:

First year wheat and clover
Second year clover and cow peas.

After the cow peas are cut in the fall, the land is sown to wheat again and to clover the following spring and the rotation as outlined above repeated. This will bring the land up with a rush and involves breaking the ground but once every two years—after the clover—and gives in that time three full crops and in very favorable seasons a half a

crop of clover after the wheat is cut. If you will study this rotation it will be seen that it does not involve as much labor or inconvenience as the growing of these three crops on separate pieces of ground.

Mr. ———Do cow peas add nitrogen to the soil?

Prof. Waters—Undoubtedly. It is a great soil improver and will grow on land too poor to grow clover successfully and will bring any land up somewhat faster than clover. This we know from direct comparison when the two were grown side by side.

Mr. ————How late in the season is it safe to sow?

Prof. Waters—Generally not later than the 5th to the 10th of July, although we have frequently gotten a fair crop sown as late as July 15, but that throws your harvest into the cool weather of the fall when rains are more or less frequent.

Mr. ———Would you recommend the growing of cow peas in the place of clover?

Prof Waters—No, except on land that is too poor to produce clover successfully. Grow as much clover as ever, but if for any reason clover fails, you can use the cow peas to advantage. To cite a case in point: last spring we sowed a piece of wheat to clover, got a nice stand but a severe drouth before the wheat was harvested killed practically all the clover. The usual procedure in such a case would have been to break this wheat stubble the latter part of July, sow to wheat again and sow clover the following spring. By hurrying matters we got the wheat off and the land broken and sown to cow peas by July 10, instead of waiting until the latter part, cut a ton and a half of cow pea hay, disked the land and sowed to wheat this fall and will sow to clover in the spring. By this means we increased our supply of feed with only the additional expense of sowing and harvesting the peas, the expense of the seed and the inconvenience of having to break the land when other work was somewhat pressing. In short, watch your chance to sandwich the cow pea in between other crops and grow clover when you can, but make sure of your hay supply from one of these crops each year. Do not go into winter without plenty of one or the other of these hays.

MISSOURI'S PECULIAR ADVANTAGES AND HER FUTURE FOR DEVELOPMENT OF IMPROVED STOCK.

By JOHN MCDAIRMAID, Des Moines, Iowa.

When a few weeks ago some one favored me with a program of your annual meeting, I am willing to admit that I lost no time in perusing its contents from beginning to end, and I am further willing to admit that, like everything truly Missourian, the program is characteristically robust and broad gauged. If there is anything in the program for the four days' proceedings that could at all mar my happiness, it is that out of the eighty or more addresses, or papers, that are to be delivered here during the four days' meeting, only the Hon. Oliver Wilson, of Illinois, and myself are supposed to put in an appearance from outside of the State of Missouri. Possibly you who have put in so much of your valuable time in Missouri are not aware that some people are rather timid about entering inside the borders of Missouri. A gifted philosophical poet has said, "A little learning is a dangerous thing." Some people have told me, confidentially, of course, that the State of Missouri has a history, and I am very much inclined to agree with them—I am inclined to go even further and assert that "the half has not been told." My friends, I think you have been a little hard on me in making me attempt to tell the other half. You have assigned me one of the greatest and grandest themes that I could desire to speak upon were I gifted to do it justice. But, my friends, you must bear with me. I am deeply sensible of my inability to place before you, and the American people in general, Missouri's peculiar advantages and her future for development of improved live stock. We know what Missouri has done along that line, and we know where she stands to-day. In making any endeavor to show the peculiar advantages of Missouri for the development of live stock, we may profitably look into her geographical location and surroundings. Without stretching our imagination too much, or taking into account newly acquired possessions, we find Missouri is so favorably situated as to be almost the heart of our United States, and we would not, even if we could, change its location. Bounded on the west by the State of Kansas

and the Missouri and Kaw rivers, she has a great advantage in having a western sister State whose greatness surprises the crowned heads of Europe and its millionaire speculators, and also feeds millions of its inhabitants. On the north lies the great State of Iowa, than which there is no better nor grander neighbor in the sisterhood of states. Along the eastern banks of Missouri flows the great Mississippi river, spanned by railway bridges cementing the friendship of the great State of Illinois, and if St. Louis markets be not big enough for your live stock or other farm products, the railroads run straight to Chicago. On the south you have Kentucky and the whole chivalrous South, including No Man's Land and the Lone Star State of Texas. These being the surroundings, what must Missouri be? We might finish right here by stating that Missouri is a nation in itself. That broad assertion is an acknowledged fact. There is no nation on the whole inhabitable globe, and there is no State in this great nation known as the United States of America, that can live within and on its own resources so well and so comfortably as Missouri, and yet we meet once in a while with some people who know so little concerning their own country that they set you down as a backwoods constituency, little knowing that Missouri far surpasses the Promised Land. Milk and honey no doubt sound well, and we believe would make a very cordial mixture, but the State of Missouri has enough of both and to spare, and of every other luxury or necessity that can be imagined. That is what makes Missouri naturally the greatest and grandest of all the sisterhood of States. She may or may not have suffered by misrepresentation, but that does not affect her natural greatness. That theme, however, is so great that it may well be left to future historians. My province concerns her peculiar advantages and her future for the development of live stock.

As most of you are aware, I have spent several years around Kansas City, the great gateway of your western and southwestern outlet. After spending over six months time in what might be called prospecting, I conceived the idea that that was the place for a man of my peculiar disposition to try and locate in. During the years that I roamed around there, I became enamoured of Kansas City and the State of Missouri—so much so that I actually believed I was a Missourian. "Time but the impression deeper makes, as streams their channel deeper wear." My love for your great State sometimes got me into hot water, or a pretty

warm argument, which is nearly as bad and not quite so refreshing. Some years ago, while standing up for Missouri, I took the broad ground that if I were given Missouri and Kansas I could pick show-herds of Shorthorn, Hereford and Aberdeen Angus cattle, and win first premium on all three breeds against the rest of the United Sstate. Since then Kansas has had the misfortune to have her greatest herd of Herefords and Shorthorns dispersed, and Missouri's greatest herd of Aberdeen Angus cattle has also been dispersed. Confining myself now to Missouri and to two breeds of cattle, leaving out the Aberdeen Angus on account of the dispersal just referred to, I think Missouri alone can beat the United States with Herefords and Shorthorns in the show ring. This is not made as an idle boast. Personally, I very much dislike that line of argument, but the records of this year's show ring come so near substantiating this that I feel that the great breeders who met these Missouri cattle of which I speak are thankful things were no worse for them.

If I were at all capable of making a proper showing of where you stand with trotting and saddle horses—a showing that would fairly represent what you have done, and where you stand to-day, it would be found that you keep the best of them guessing in both camps. In show swine Missouri has long been invincible. Some years ago Missouri held the butter record of the world and then beat its own record. Though not strictly of the improved stock variety, Missouri mules won at the Columbian Exposition, and they have also made their presence known in the South African war. In dairy cattle and in sheep we think the State should have advanced far beyond its present standing. We know that one of the most substantial farmers in the State forced his way, by steady, intelligent methods, to an independent competency by sheep alone, on land now worth $75 an acre. There is nothing in the climatic conditions of Missouri especially adverse to it becoming a great dairying State, and there is much for the State which, in our opinion, is specially favorable to operating profitably along dairy lines. Some one has said, "Man is larger and stronger than his environment." If that be true, what might yet be accomplished by Missourians along dairy lines in comparison to what is being done now? Such a question is pertinent to the material welfare of thousands of the citizens of the State of Missouri,

even though it does not affect the main argument regarding Missouri's peculiar advantages.

The natural or peculiar advantages of the State of Missouri for the highest development of improved live stock have for years presented themselves to my mind. Through my way of looking at things I have not by any means been surprised at the commanding position your breeders have taken and now hold with Missouri's improved live stock. The great State of Missouri has no peer, and possibly no equal, when you come to consider the combination she affords in grasses and grain; in shade and in watering facilities; in the humid temperature of her climatic moderation. Of course you are troubled with flies. Those pests know enough not to keep away from a State where there is always plenty to eat and drink. We think, however, that, admitting the naturally superior peculiar advantages of the State of Missouri in itself, the State has been peculiarly fortunate in the great personality of its breeders. As a matter of fact the improved live stock breeders of Missouri will at the present time compare favorably with the improved stock breeders of any age or country, and they are a tower of strength to this country from a national standpoint. This is true, not only of veterans and middle aged breeders, but it is also significantly true of the young breeders of the State of Missouri. So much is this in evidence that the older breeders may well look to their laurels. Keep on with your persistent magnanimity.

"By thine own soul's law learn to live,
And if man thwart thee take no heed,
And if men hate thee have no care;
Sing thou thy song and do thy deed."

By the scope and double nature of the theme allotted to me I dare not conclude without some reference to Missouri's possibilities in the future. Here let us devote a few words to showing where Missouri stands at present. In order to give you some idea of your present standing, I have been looking up your record—the record made by the Hereford and Shorthorn breeders of the State at the recent great show at Kansas City. In what can be considered as strictly class premiums there were 118 premiums offered. Out of that Missouri breeders, with Missouri Herefords, won sixty-nine prizes. There were thirteen classes and nine of the first prizes and nine of the second honors fell to Mis-

souri. Missouri Herefords also won first and third in aged herds, first and second in young herds, first and second in calf herds, and had the high honor of selling a yearling bull at $5,000. The Shorthorns had the same number of class premiums, and Missouri breeders won fifty-nine of them. In addition to that they won sweepstakes on aged bull and on aged cow. In aged herd they won first and third, in best ten head, either sex, first and second, and the coveted Armour trophy was won by a Missouri bull. This showing does not take any notice of winnings of special premiums. Although the showing is extra good there, conditions were such that they do not prove anything in particular. This partial showing, however, gives a pretty fair estimate of where the State of Missouri stands to-day with at least two breeds of cattle. The State is equally favorable to the same high development of other breeds of improved live stock. This being the condition at present, we can not entertain any fears for the future. My own observations, extending over twelve years, convince me that live stock does not deteroriate in Missouri from any causes natural to the State. We have seen excellent stock brought into the State; some had been highly kept and others that had not had full justice done to them in their development, but we have been unable to observe any deterioration. Further improvement, in our opinion, is the natural tendency in Missouri. Shrinkage, withering or pining is unnatural for man or beast in Missouri. Education itself is broadening within your borders. So far as I can determine the future I can see no limit to your progress and higher development. No state or country is more favorably located as regards environment or progressive neighbors. Your future then can be just as great as you make it. If your present showing be taken as an index of your future possibilities, then it must be admitted your "lines have fallen in pleasant places, and your heritage is a goodly heritage."

ALFALFA CLOVER.

By GEO. W. WILLIAMS, Humansville, Mo.

As hay or grass growing is getting to be a problem in this country, as well as many others, it is necessary for us to look around and see what is best adapted to our climate and conditions. Thirty years ago there were no timothy meadows in this neighborhood, in fact there was an impression among the farmers that timothy would not grow here (there was a light acreage of red top), but the writer—"like Collin's noted sheep"—being of an inquisitive mind, began experimenting by sowing twenty acres in timothy, at the rate of one bushel of seed to three acres, sowing in the spring. The crop that I cut the second year, "astonished the natives," myself included. After it was demonstrated that timothy would do well here, the acreage has increased until there is as large a per cent of the tillable land in meadow as in any part of the State. We predicted then that timothy was the coming grass, and it came and has been here a quarter of a century. Now let us make another prediction: Alfalfa is the coming "grass" of this country, and will, like timothy, stay until we find something better.

I have been experimenting five years with Alfalfa and find that if sown at the proper time and in the proper manner, it will do well here in any of our tillable land, *except the very low wet bottoms*; it will not do well on land that does not drain well. Where the water stands twenty-four hours after it stops raining, Alfalfa need not be sown, for it can not stand wet, cold feet. In preparing the seed bed, break the ground if possible in *late* fall, if not, spring breaking will do; but if broke in the spring it should be done at least two weeks before sowing. This gives time for the soil to go through the chemical process that it passes through when first plowed, and which is detrimental to many plants if the seed is sown until it is passed through. I would advise the preparation of the land just as for a strawberry field—*i. e.*—break with an ordinary two-horse plow, following in the furrow with a *single* shovel—or bull-tongue—and break up the hard-pan or loosen up the gravel, as the case may be, but not throwing the subsoil out on top. This under plowing answers a

two-fold purpose; first it forms an under drainage that carries off all surplus water, and in a dry time it acts as a reservoir to hold moisture, both of which is very essential in the growing of Alfalfa. Sow the seed about the middle of May, or first of June, sowing eighteen or twenty pounds of seed to the acre. It grows up very slow, and when the weeds get up, say ten or twelve inches high, run the mower over it, setting it just high enough to pass over the Alfalfa at this cutting. Then again, when the weeds cover the second time, cut again; this time you can cut the Alfalfa, but not too close, and it may be necessary to cut over it the third time; if so, *cut over it; keep the weeds down.*

The second year it will produce a light crop of feed and can be cut twice, but it is not at its best until the third year; in fact, I don't know when it does get to its *best.* I have some five years old and it has been getting better all the time—is better this year than ever, but we may expect a full crop the third year. It should be cut as it begins to bloom, that is to say when the field begins to look blue with bloom; after cutting, the curing is the same as any other hay only don't let it get so dry that the leaves "shatter" off in handling, and it should be put under shelter or stacks topped out with some finer stuff (red-top is best for that purpose). It can be cut three times here, the first cutting yielding the most, which is about two full tons of cured hay to the acre; the second cutting from one to one and a half, and the third cutting from three-fourths to a ton—making four tons during the season. As to its feeding qualities, "let me say in the language of the boy" "it is immense."

I have not found any stock that had to "learn" to eat it, they already knew how. Horses, cattle, hogs and chickens all eat it greedily, and it answers the purpose of both hay and grain—it is a combination of both. Stock will eat it either green, wilted or cured. Try feeding it green to your sows and pigs, if you want to see pigs grow as you never saw pigs grow before. Cut up the green leaves fine and feed it to your little chickens and watch them grow, and for a winter "green" feed for chickens there is nothing that will equal the shattered leaves. I might have said that in preparing the ground, after breaking, leave it untouched until ready to sow when it should be thoroughly pulverized, and after sowing cover the seed lightly by running a light harrow or drag over the ground.

You that are puzzling over what to sow, try Alfalfa and I think you

will be pleased with results. I have no "ax to grind" in writing this article, as I have no Alfalfa seed to sell; but on the other hand have just bought 150 pounds more of seed to sow; this I shall sow on eight acres. Let me repeat, try Alfalfa.

IMMUNIZING PURE-BRED CATTLE AGAINST TEXAS FEVER FOR THE SOUTHERN MARKET.*

By J. W. CONNAWAY, Veterinarian to the Missouri Agricultural Experiment Station.

Mr. President, and gentlemen of the Improved Live-Stock Breeders' Association:—As this is the third time I have been requested to address this Association on the topic announced, it is evident that the matter of immunizing pure-bred cattle for sale in the Texas fever district is not losing interest for our breeders.

At the meeting held a year ago, I gave a summary of the experimental work, and results up to that time. A fuller report, exclusive of work in progress, appeared in Bulletin No. 48, issued by our Experiment Station and State Board of Agriculture, also in Bulletin No. 53 of the Texas Experiment Station. In this work, as you know, we have had from the outset the co-operation of the Texas Experiment Station, as well as the material financial aid of our own State Board of Agriculture. This mutually helpful co-operation is still maintained.

During the past year and a half our work on Texas fever matters has been confined mainly to inoculation; to determine the limits of usefulness of this method of immunizing against the "fever." During this time we have inoculated a large number of animals; and covered a wider range of conditions than before. On account of the greater risks that have been taken, the percentage of loss has been increased, as was to be expected; this, however, is a legitimate feature of experiment work, and is not laid up against us by the sensible stockmen, upon whom much of the burden has fallen, more especially since the facts developed enable us to enlarge the field of usefulness of inoculation, even if in some directions it must remain restricted.

* Revised since first delivered.

The number of cattle inoculated to date under the direction of both stations, is 5,053 head. You will recall that the loss in the lot of 432 head previously reported was a little over 8 per cent from inoculation and subsequent tick-infestation. It will be necessary to consider the remaining 4,621 head under different groups. A direct comparison of the entire lot with those previously reported can not be made; since some of those more recently inoculated have not yet been sufficiently exposed to tick-infestation, and a certain group containing quite a large number of animals may escape the ticks altogether. While the circumstances prevent us from using some of the inoculated lots in support of conclusions as to the effectiveness of inoculation against "tick-fever" after exposure to infected grounds, we are justified, however, in seeking from the entire lot data bearing upon the dangers from the "inoculation fever." This is a matter of much importance to those of you who wish to enlarge your trade in the infected territory; and are willing to share with your southern customers some of the risks of immunizing your calves against the fever. The facts developed, I am confident, will bear me out in the statement that it is practicable for our cattle breeders to have their calves that are intended for the southern trade practically immune to the fever by the time they are of servicable age.

How this may be accomplished you will understand better after we have considered the different groups of cattle that have been inoculated and looked somewhat into the nature of immunity as applied to this disease.

I shall first mention the work of the Texas Experiment Station, a brief report of which Dr. Francis has recently supplied me for use in this paper. In response to my request for a statement of the number of cattle inoculated, and the losses from inoculation and from tick-infestation, he says: "From November, 1899, to November, 1900, we inoculated 622 head of cattle of which number we had about 50 deaths. I can not tell just how many died from inoculation and how many from fever afterwards. From November, 1900, to April, 1901, we have done 502, of which we have had 20 deaths. Most of these deaths came from the cattle becoming ticky *before* inoculation. We have had a very mild winter and there were ticks everywhere. It is very hard to impress upon the owners of the cattle the importance of having them inoculated before the ticks get on them. The number of deaths I report may not be absolutely

correct because I have not heard from some of the cattle for two weeks or so, but it is certainly very near correct."

I regret that the circumstances render it impossible to secure complete data from the Texas work bearing upon one point in which we are particularly interested—namely *losses from inoculation* apart from tick infestation. The inoculations in that State, you understand, have nearly all been done in the infected territory; and a considerable number of them at the ranches of stockmen, where in many cases no special provisions were made to keep the animals free from ticks during the inoculation period.

The report, however, is of interest in showing how successful the work has been even under the unfavorable conditions mentioned. The first group reported shows a loss of but little over 8 per cent and we can safely regard the surviving animals of this group as being practically immune, since nearly all we were inoculated in the latter part if 1899 and the early part of 1900 and have had a summer season of exposure to the ticks. In the second group the loss to date is but 4 per cent—further losses, however, are to be expected when the cattle of this group are exposed to the more virulent infection of the coming summer season.

No doubt still better results will follow when the southern stockmen, more generally, come to appreciate the importance of providing and maintaining *tick-free* pastures for the cattle that are undergoing the immunizing process, and realize the fact that immunity against the infection can not be fully established within a few weeks after inoculating an animal; but that as a rule several months are necessary for the susceptible animal to develop the powers of resistance shown by mature southern cattle. If during this period, they are exposed to an especially virulent tick-infection some loss is sure to occur. If, however, the animals are kept free from ticks several months and inoculated a number of times, with a gradual increase in the size of dose, the risks from exposure to ticks afterwards will not be so great, for when the animal is repeatedly infected, solely by means of the hypodermic syringe, the degree of the infection can to a great extent be controlled—and if the condition of the animal at any time shows that it would be unsafe to introduce additional infection, it can be withheld for a while. On the other hand if the cattle are put on tick-infested grounds before inoculation or too soon thereafter, no control either of the degree or time of infection is possible. It is, how-

ever, practicable to maintain clean ground in the quarantined district, upon which inoculated animals can be kept free from ticks until by repeated inoculations they are safe against virulent tick-infection.

Dr. Francis has already suggested to his people methods by which clean grounds may be secured, and I predict that when these suggestions are more generally adopted, and several inoculations are given before exposing the animals to tick-infestation, the losses instead of being 8 per cent will not be above 4 per cent in the class of cattle mainly used in the Texas work, that is calves from 8 to 12 months old. This applies also to calves of same age inoculated before shipping south. It will hardly be possible to reduce the loss in this class of cattle much below the figure mentioned. Almost this much loss will occur from inoculation alone when thoroughly done, and by this I mean so well done that the risks from virulent tick-infection will be practically nil. I have data, however, that leads me to think, that by beginning the inoculation early in the life of the calf the losses can be still further reduced possibly to 2 per cent, especially if reinoculated a time or two on clean grounds in the south before exposed to ticks.

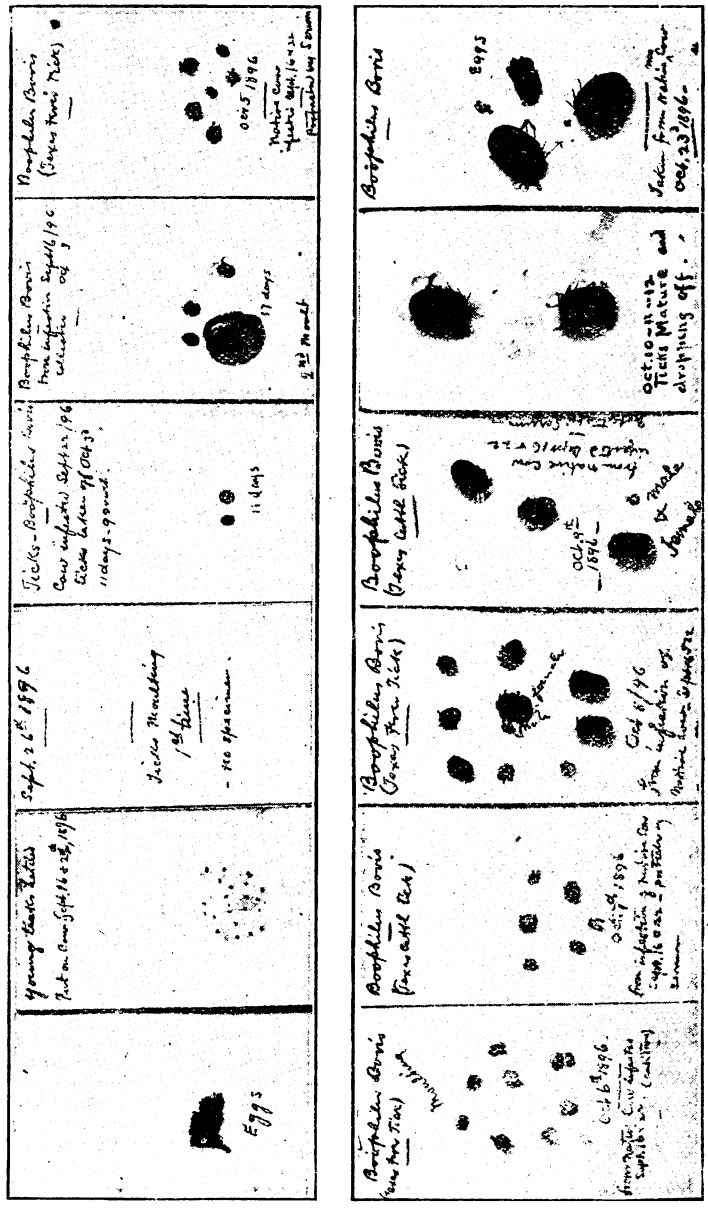
Young "Fever Ticks" and Eggs—greatly enlarged.

There is the best of evidence that southern born calves at time of birth are no more resistant to the fever than those dropped in the north—and that they acquire their immunity through a prolonged period of *natural inoculation,* that is tick-infestation. The resistance of the unweaned calf toward the fever is so marked that at the south the *fever* (through which the calf actually passes) is overlooked by the ordinary

observer, or the signs of illness are credited to other causes. If, however, one of these southern born calves is kept free from ticks for several months and then exposed to a virulent infection an unmistakable case of the fever develops. This has been observed repeatedly in various parts of the south. Mr. Myers of Blue Grove, Texas, in a letter last summer, mentions having lost some of his native calves from Texas fever—these calves were dropped late and in some way escaped infestation during the fall, winter and spring, and became grossly infested during the summer, when they were probably 8 to 12 months old. Campbell Russell of Bennett, Ind. Ter., reports a similar experience with native raised calves. Hon. R. J. Kleberg, Secretary of the Texas Live Stock Sanitary Board, told me of a case where a considerable number of cattle on some ranch in that State had escaped tick infestation and grown up susceptible to the disease. These cattle when driven over infected ranges contracted the fever. Dr. Francis says he has seen calves raised in Bryan, Texas, contract the fever when put out on pasture. The evidence of these gentlemen, with whom some of you have had business dealings, is sufficient to show that the southern calf is not born immune, nor acquires it from the milk of the mother, as was once thought. The immunity in fact is acquired through combat with the infection that has been introduced into the blood by means of the "fever tick." That full immunity is not quickly acquired on the part of southern cattle is shown by an observation I made in Macon county this State in November, 1898, on a lot of young cattle, eight to twelve months old that had been recently shipped from Victoria county, Texas, and showed evidences of having been well infested with ticks. Quite a number of these cattle died after arrival and showed unquestionable signs of Texas fever before death, and on post mortem examination. The conditions, however, that brought this about were out of the ordinary. These young cattle had had a long and fatiguing journey from southern Texas to St. Louis; and without much rest had been plunged into a cold oil bath to rid them of the ticks they were carrying. They were then shipped to Macon county in the north part of the State. At the time of their arrival the weather had become quite cool. Under usual conditions these calves would no doubt have remained in apparent health. These observations show that even with southern raised calves *considerable time* is required to establish what we

may regard as complete immunity.*

We have shown the susceptibility of the southern born calf to the fever. But it will be more to the point if we can establish that the



Texas Fever Tick in various stages of growth—about natural size.

* Absolute immunity against the "fever" is not attained even by native southern cattle that have been exposed to tick infestation several seasons. Some have been known to die showing the typical lesions of the fever. Such cases, however, are very rare.

young northern calf is as resistant to the infection as the southern calf under similar conditions.

That our northern calves are very resistant to the natural infection is a fact that has often been noted in outbreaks of Texas fever that have occurred in herds of this State. Young calves usually escape while nearly all the mature animals succumb. Southern stockmen who sometimes buy northern cows with calf have a like experience; the mother dies, and the calf is put to nurse a southern cow, and if well nourished, no trouble is experienced in raising the young animal and it shows no more signs of fever than the native southern calf. Some southern stockmen buy in the North registered calves a few weeks old, send them down by express and put them with a nurse cow on arrival. They report excellent results, but this is manifestly an expensive and inconvenient plan. But since the infection can be introduced into the calf in an artificial way by means of the hypodermic syringe, quite as well as by the ticks, and the degree of the infection can be more safely guarded, and especially as this can be done without danger of infecting the mother or other cattle of the herd, there is no necessity of taking a calf away from its own mother and the luxuriant blue grass pastures of this State in order to immunize it against the fever. I am aware that practical business men, such as our breeders are, will not be likely to take up inoculation, or at least continue it, even though the aggregate losses from inoculation and from exposure to the ticks after shipment to the infected territory should be very greatly reduced by beginning the inoculation during the nursing period unless the risks and inconveniences to themselves promise to be slight, and are greatly offset by benefits that are to accrue. We will consider the risks: I am often asked, is there any danger to the mother and to the breeding herd? There is not the least, for there is no possible way for the germ to pass from the calf to the mother. In nature the tick is the only transmitter of the infection; and in this work, we have nothing to do with the ticks until the calf is weaned and shipped into the infected territory. We have had cattle with infected blood at the College Farm for several years. These cattle have mingled freely with the thoroughbred beef and dairy cattle, and we have never had a case of accidental transmission of the fever.

From what has already been said in regard to the resistance of young calves to the natural infection, you will not expect many of them to

die from inoculation; for if the calves dropped in the South or shipped there when quite young can stand the virulent tick infestation through the prolonged warm season of that country, the northern raised calf should not suffer severely from the infection when conveyed by careful inoculation, moreover I think that the climatic conditions are more favor-

A cow with infected blood—used for inoculation—this cow has run with the farm cattle without danger to the latter.

able; and certainly the nutrition of the calf is better provided for on an up-to-date cattle-breeder's farm than is possible on most of the large cattle ranges. We have moreover some interesting experimental data showing risks from inoculating young calves as compared with older cattle. I will call attention to this in the report which is now given of the work carried out under the direction of the Missouri Station.

The work of the Missouri Station has included animals of various ages from calves of a few days old to aged cattle. The per cent of loss in the group that has been fully exposed to ticks has accordingly run higher than in our previous work and higher than that reported herein from the Texas Station, where the inoculations have in the main been confined to safer limits in the matter of age.

The total number of cattle inoculated under the direction of the Missouri Station is about 3,495 head. Of these 659 head were inoculated at or near the Experiment Station at Columbia. These were under daily observation sixty days or longer. A few lots were kept from 6 to 8 months. Daily temperature records were kept on the greater number of those inoculated—and the condition of the blood was determined from time to time. Two thousand eight hundred and forty-six head were inoculated at the Chowchilla Ranch in California.

The losses have been as follows: In a group of 357 head inoculated at the Station between September 15, 1899, and June 1, 1900, 13 head or 3.6 per cent died from inoculation before exposure to ticks. The losses after shipment were about 11 per cent, bringing the total losses something above 14 per cent. This group included quite a number of animals that in my judgment were not fit subjects for inoculations, on account of age or condition at the time they were inoculated. But as the owners of the cattle were anxious to try the experiment I was very willing to include these unfit subjects. Fortunately some of these animals lived and have done good service since shipping south. I will call attention later to certain lots that have particular interest.

In a group of 302 head inoculated at the Experiment Station, or in the neighborhood, between June 1, 1900, and April 1, 1901, 12 head or 4 per cent died from inoculation before shipment to the infected territory. This group included some old cows that were used purely for experimental purposes and not intended for shipment. This group, moreover, was inoculated somewhat more heavily than that of the preceding year, the purpose being to prevent as much as possible the relapses that were shown in the previous year's work. It is yet too early to give you a report on the results of the exposure of this group to tick infestation.

In the lots inoculated near the Station were 65 head of calves that were inoculated before weaning. Thirteen head of these were dairy calves which were put on skim milk a short time after inoculation. These showed but little outward signs of fever, one however died from digestive troubles, and some of the others were not as thrifty for a time as calves that run with their mothers. Twenty head of Hereford calves of this group were weaned about a month after inoculation; a few of these showed signs of fever after they were taken away from their mothers. None, however, died from the inoculation. Change from milk to grain

and hay diet during the inoculation period is never advisable. A lot of 32 head varying in age from a few days to two months old were allowed to run with their mothers during the immunizing period. Some of these were cheap calves that had been bought with their dams for experiment, and were purposely inoculated with excessive doses of infected blood. No deaths occurred from the fever, although two weaklings succumbed to digestive disorders and two more that had been inoculated with large doses and whose mothers had died from inoculation became very unthrifty from lack of proper nutrition, while *all* the well-nourished calves that had been inoculated with moderate doses showed but little signs of fever and continued in good condition. Some of these were re-inoculated two or more times.

The inoculation work in California was done on the Chowchilla Ranch near Merced. A part of this ranch had become infected with the "fever ticks," that have been brought to neighboring ranches by cattle from the southern part of the State. Serious losses had occurred on the infected part of the ranch. And as it was feared that in time the infection would spread over the entire ranch (containing about 117,000 acres) it was thought prudent to begin immunizing the susceptible cattle of the herd against the infection. As a large part of the ranch had never been infected, I advised the protection of the non-infected fields by good fencing and by plowing a quarantine strip next to the infected fields as well as burning off the latter. I further advised that all mature breeding cattle that were susceptible, be kept in the clean fields and not subjected to inoculation; further that all beef stock that would be ready for the market in a few months be handled in the same manner. As it would be necessary, however, to use some of the infected grounds for grazing purposes before the close of the season, we selected for inoculation nearly a thousand head of cattle that were thought to be susceptible. Of these 107 were sucking calves. The remaining 886 head varied in age from 8 months to 5 or 6 years old, the greater part were yearlings and two year olds. I advised the superintendent to inoculate all the young calves that were dropped during the season, giving them at least two inoculations before weaning. The first inoculation to be given when the calf was between 6 and 12 weeks old, and the second one 40 days or more before weaning.

This plan has been followed, and since my visit last April (1900)

there have been 1,843 more sucking calves of last year's crop inoculated. Making a total of 1,950 sucking calves. The loss from inoculation in the older cattle was 24 head, or a little less than 3 per cent, while the number of deaths from inoculation among the sucking calves were 18 head, a loss of less than 1 per cent. I think it possible that some of the older cattle of the group may have become immune through tick-infestation during the two or three years previous; and that the per cent of loss mentioned (less than 3 per cent) does not represent the full loss that would have occurred in cattle of same age and condition, in which there was no doubt in regard to their susceptibility; this however does not apply to the young calves as none of these had ever been exposed to ticks.

Group of Inoculated Calves.

By following the suggestions I made in regard to cleaning their fields of ticks, such as fencing, plowing, mowing and burning the grass, and inspecting the cattle, Mr. Bird, the superintendent, appears to have succeeded in clearing the ranch completely from the infection. I am therefore unable to give figures showing losses from exposure of inoculated cattle to tick-infestation. It is to be hoped that the infection will be kept out and that no occasion will arise for a record of losses from this cause. The tick-infection has not, however, disappeared from some other ranches in the district. And, to guard against losses from a possible tick-invasion in the future, inoculation will be continued. Mr. Bird in a recent letter says: "I am inoculating all this year's calves."

I have presented this case somewhat fully because of the large number of animals involved, and because results add force to the contention that no serious risks attach to the work of inoculating sucking calves, if the work is done carefully and the calf is kept properly nourished. The post mortems I made on several of the older cattle showed all the typical lesions of Texas fever and proves that the material used on the calves was sufficiently virulent for immunizing purposes.

That infected ground of considerable extent may be cleaned is also shown, and I am confident that the application of the same measures will result as happily in any part of the infected region at the south, where any ranchman may wish to clean grounds for the temporary use of cattle during the inoculation period.

In the inoculation of weaned calves, yearlings and older animals there are objectionable features besides the losses reported, that we expect to almost eliminate, by beginning the work on the younger, more resistant and more recuperative animal, the sucking calf. The objectional features referred to are: the nursing and medical treatment that some of the older animals require during the inoculation period, as well as after tick infestation. We do not have complete data as to the number of inoculated animals that actually show fever during their first summer of exposure to ticks. But our reports show that in addition to those that die from acute attacks of the fever a considerable number are sufficiently ill to require attention for a while.

In this connection, I will call your attention to some of the lots of cattle sent South from the Missouri Experiment Station.

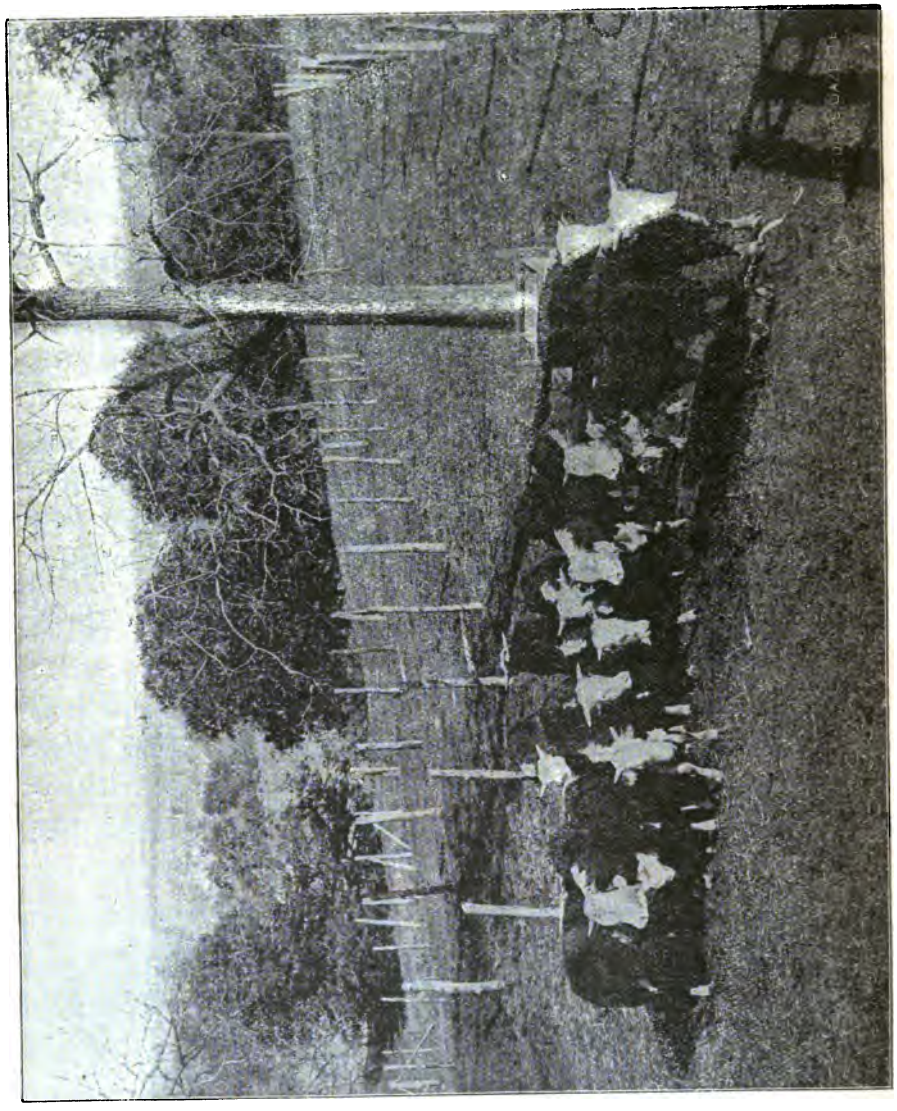
In a lot of 21 head of registered bulls and heifers that we inoculated for Mr. John Kennedy of the LaParra Ranch near Corpus Christi, the ages of the cattle at the time of inoculation were as follows: One bull a few days under *three years old,* one heifer almost two years old, seven head from 15 to 18 months old, six head from 10 to 13 months old and six head from 4 to 7 months old. The three year old bull, and another about 18 months old died from acute attacks of the fever, resulting from the inoculation. Two of the oldest heifers had acute fever and passed

Cattle too Old for Best Results from Inoculation.

bloody urine, but recovered. The other animals in this lot of about same age had considerable fever and required treatment. The 10 to 13 months old calves did not require so much attention; and the 4 to 7 months old calves gave still less trouble. The latter were inoculated with small doses, as they had only recently been taken from their mothers. All of them showed some fever and reduction in percentage of corpuscles. But notwithstanding they were deprived of the mother's milk, they showed some increase in weight, at time of shipment, about 75 days after inoculation; while in the case of some of the older animals, the weight was less at time of shipment than before the inoculation. It requires a longer time for older animals to recuperate. Mr. Kennedy reported that these cattle arrived in Texas in apparently good condition, except one that appears to have been bruised in shipment. This one died a few days later.

About a month later nearly all the cattle showed marked symptoms of fever, after becoming infested with ticks, and required attention for a short time, only one, however, died from the tick infestation. The results show that they had not been fully immunized by the one inoculation. One or more reinoculations on tick free grounds are preferable to the risks that come from gross infestation with ticks. Considering the ages of some of the animals in the above lot the results are not bad.

In a lot of 31 head of registered bulls varying in age from 8 to 14 months old, inoculated for R. J. Kleberg, Manager of the King Ranch, we lost two from inoculation and five from tick infestation. Most of those that died were bulls of the older age, and had not shown very marked fever from inoculation. Two of them, however, had shown considerable fever, and a well marked reduction in number of corpuscles. Moreover all of these bulls had carried ticks early in the season and were thought to be safe. Gross tick-infestation however, when the weather became warmer provoked an acute attack of fever in quite a number of the animals. I now believe that if these animals had been reinoculated several times on tick-free grounds the losses and relapses mentioned would have been less severe. In this group I must mention one bull, a very valuable young animal, that was kept with a nurse cow in addition to having a grain and hay ration, during the inoculation period. This calf received two inoculations and while the temperature record shows that the calf had fever, no one would have suspected it from outward



Part of group inoculated for King Ranch, Alice, Texas

symptoms, the young animal never lost a meal and during the 80 days following inoculation his weight increased from 630 to 800 pounds. After sending south he became as frequently and as grossly infested with ticks as any of the other bulls, but no signs of fever were apparent during the summer.

In a lot of 62 head inoculated for Joseph F. Green, Encinal, Texas, the older animals of the lot suffered more severely than the younger ones. Six head died from inoculation or from tick infestation and a few more required treatment.

For the Landa Cattle Company, New Brannfels, Texas, a lot of 82 head varying from 7 months to 18 months old were inoculated. In the lot were 31 bulls and 51 heifers. Two bulls and 2 heifers died from inoculation at Columbia. And after the cattle were shipped 18 of the bulls showed well marked fever when exposed to ticks and six of the lot died. The greater part of the loss was among the older bulls. Less trouble was had with the heifers. Eleven head of these showed considerable fever when exposed to the ticks. Only one however died from this cause. A few of the bulls that died from tick-infestation were inoculated four times with small doses without showing any fever. On two occasions, however, the weather was quite cold when the inoculations were made, and I think it probable that the blood used for inoculation was chilled sufficiently to destroy its virulence.

The heaviest loss in any lot we have inoculated was in a lot of young Hereford bulls imported from England by Messrs. Busk and Anson of Coleman, Texas. These bulls were not in condition for inoculation when they arrived at the Station. They had been reduced in flesh under the mistaken notion that this was a necessary preparation for inoculation. After the bulls had somewhat regained condition they were inoculated, smaller doses than usual being given. Every bull except one showed a well defined fever from the inoculation; and a low percentage of blood corpuscles was shown in nearly all. One bull passed bloody urine but recovered. Several of the lot required medical treatment. And while we did not lose one of these from the inoculation, we never have had a lot of bulls that showed a more marked susceptibility to the infection. These bulls at time of shipment to Texas were free from fever, but most of them had not regained their normal percentage of blood corpuscles. They arrived in Texas in the latter part of March, but did not become

infested with ticks until the middle of June. Soon after this the bull that had shown no fever at the Station, died, and before the summer was over ten more had died from the fever and two more from blackleg or other causes.

It was my opinion at the time these bulls were shipped that with good care in the way of feeding they would soon regain their vigor and prove the most resistant lot that had been sent south. But the results show that their powers of resistance were very weak and that they should not have been sent south at the time they were. If they had been kept on pasture at the north through the summer and reinoculated a few times and sent south the following winter, I am confident that most of the bulls would now be well and doing good service; or if they had been in proper condition for shipment earlier in the winter and received a few mild infestations with ticks, the results might have been better; but the degree and virulence of tick-infestation where this is left to natural means is impossible to regulate. Reinoculation and retention on clean grounds at the ranch for a few months would have been preferable.

In this connection I will mention a lot that came to the Station too late to get in condition for shipment to the infected territory before the warm weather. This was a lot of 19 head of Shorthorn bulls and heifers inoculated for the Province Cattle Company, Grenada, Mississippi. These cattle were from eight to fifteen months of age. They were inoculated March 10th, with small doses (three-fourths to one cubic centimeter) of blood from an immunized animal. Every one showed fever, and a reduced percentage of red blood-corpuscles. As it was thought imprudent to expose these cattle to ticks during the hot weather, they were put on pasture near the Station and their blood examined from time to time to determine when it would would be safe to reinoculate. On June 8 they were all reinoculated with a dose of 2 cc infected blood. On July 13 a third inoculation was given; the dosage being from 3 to 4 cubic centimeters. August 21 all were inoculated a fourth time, the dose being five cubic centimeters. A month after this last inoculation the blood of one of the largest bulls showed 19 per cent of red blood corpuscles. The blood of others registered low at times during the summer, and it is probable that if they had been shipped south and exposed during the summer to gross tick infestation several of them would have died. Under the plan followed none died from the inoculation, and the owner in a recent

letter says that they became infested with ticks soon after their arrival in Mississippi early in October, and have carried ticks ever since, but have not shown the least sign of illness.

I wish to say that an over fat animal is an objectionable subject for inoculation. We have had several of these and nearly all have given trouble. In a lot of four bulls inoculated for Mr. L. F. Wilson, of Holliday, Texas, were two young bulls about ten months old that were very fat, and two older bulls between twenty and twenty-four months old, that were in good strong condition but had no excess of fat. Both the younger bulls had a very acute attack of fever from which one died, the other had a somewhat prolonged attack but recovered. The two older bulls, contrary to expectation had only a mild attack of fever, and after recovery were given a second inoculation from which they suffered but little. Both of the latter have given good service during the past season. One of them, however, had a sharp attack of fever when first infested with ticks.

Another case is that of the Hereford bull, "Elberta," which some of you will remember as one of the premium yearlings at the Kansas City cattle show in the fall of 1899. This bull, in addition to being in show-yard condition, was not far from the two-year-old mark when inoculated. He was given two very small doses of infected blood while at the Missouri Station and had a mild attack of fever. Showing a temporary rise of temperature on the 16th day, and another rise on the 19th and 20th days; during the latter period a maximum temperature of 106 degrees F. was shown. After shipment to the ranch in February, the animal became infested with ticks and carried a few during the spring and early summer, an effort was made to prevent gross infestation by an occasional oiling of the legs and belly. But unfortunately Mr. Gordon, the owner, concluded to go out of the cattle business; and sold this bull with others at Fort Worth, in July, 1900. The shipment of the bull during the hot weather, from the ranch near Weatherford to Fort Worth, the exposure to gross tick-infestation in the sale yards, and the heat and worry of another shipment to San Angelo brought on an acute attack of the fever from which the animal died. It is probable that the bull would have lived and become fully immune had he not been shipped about during this first summer.

I think it unnecessary to make special mention of other lots. In

some of these that we have inoculated no losses have occurred, while in others he losses have been light.

I have purposely selected and dwelt upon certain lots to show you some of the limitations of inoculation, and to induce those of you who are specially interested in the southern trade to lend a hand in bringing into larger commercial use a method that I am certain will greatly reduce the percentage of loss, besides eliminating other objectionable features.

From the facts that have been given, you can readily see that a *considerable period of time* is an essential element in the *thorough* immunization of an animal against the fever. By beginning the inoculations earlier in the life of the animal, this time element will be taken up in the unproductive period of the calf's life and not lap onto the period when the animal should be in active service, as is the case when the inoculation is deferred until the animal is from ten to twelve months or older. I am confident that the ideal way is to begin the inoculations at your stock farms in the spring, a few weeks after the calf has dropped; care being taken to see that the calf is in good health and vigorous at time of inoculation. The inoculations to be repeated at appropriate intervals through the summer and fall up to weaning time. One or more inoculations may be given after the calf has been weaned and before shipping south, but the calf should be fully recovered from any shrinkage that weaning may cause, and well accustomed to its new diet before these last inoculations are given. The intervals between inoculations, and the size of the dose will depend upon the condition of each animal; these matters should be left to the judgment of operators who have had experience. Calves treated in the manner described I am sure will be practically immune by the time they are ready for service, and will give your customers little or no trouble, and will give good service during the first season.

It is best to send cattle south in the winter in order that they may more readily accommodate themselves to the climatic conditions of that country. This will also give an opportunity to inoculate at the south any late calves that may require it, at a time when the danger from gross tick-infestation is least.

There is one important point I had almost overlooked; and that is—will inoculation of the sucking calf produce any stunting effect? So far as my observations extend I feel assured that no appreciable

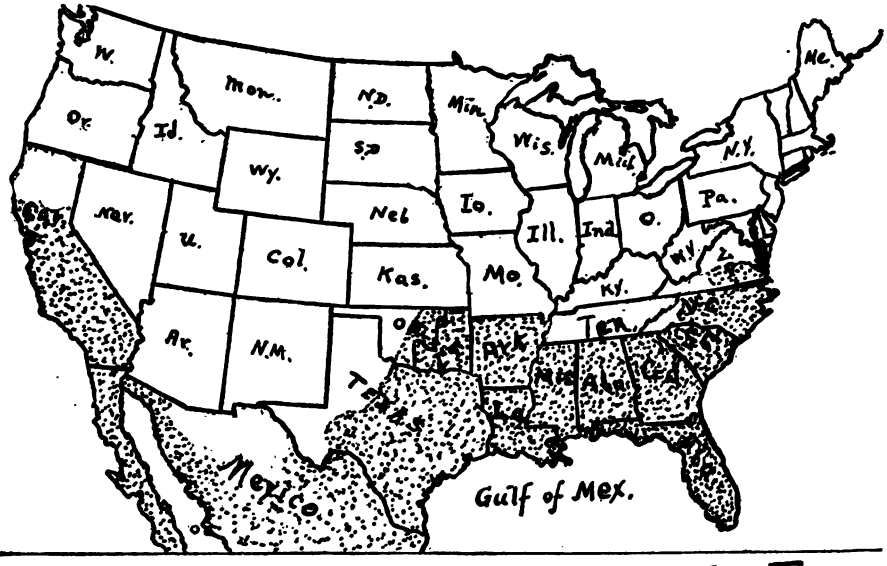
stunting effects will occur to interfere with the extensive application of this method. In a few cases where the inoculated calves were not well nourished I have observed a lack of development; but how much of this was due to the inoculation or to other causes I am unable to say. The same effects have been observed in calves that have not been inoculated. In no case, however, where the mother supplied a good flow of milk has any stunting effect been observed. The blood-making function of cattle is at its height during calfhood and it is reasonable to suppose that the inoculation of the blood-parasite that produces the fever would have the least deleterious effect at this period of life. Success is dependent upon keeping the calves well nourished; and as all successful breeders are masters of this art, but little trouble from stunting need be anticipated. During the coming summer I will have an opportunity to make a careful comparative study of inoculated sucking calves with a lot of same age that are not inoculated, and will be able to present you figures on the matter at the next meeting.

While the best results are doubtless to be attained by beginning the inoculations early in the life of the animal to be immunized, it is not probable that this plan will entirely supplant the inoculation of older animals from the fact that the number of northern breeders who will turn their attention exclusively to southern trade will never be large enough to supply the demand, and the herds of other breeders whose principal trade is outside the infected territory must be drawn upon. Many animals, therefore, that have passed the period of calfhood will still be bought and inoculated. Preference, however, will quite naturally be given to animals that have already been immunized; and such will command a better price. The enviable reputation of our Missouri cattle breeders for producing animals of the very best quality has already attracted a great deal of southern trade; and if you will add the further reputation of supplying animals that resist the fever this trade will be greatly enlarged.

The Experiment Station authorities will grant my services free of charge, to assist any of you in establishing the work of immunizing your calves at home. The incidental expenses of travel to and from your place you would of course bear.

The economic importance of methods immunizing cattle against the fever may be emphasized by a glance at the maps I present showing the

extent of infected territory in our own country and in foreign lands. The extent of infected territory in our own country in which cattle raising can be carried on with success, and that in time will afford good market for immunized thoroughbred cattle is very large. I hardly need say more in regard to the State of Texas for all of you are familiar with its reputa-



Map Showing territory of the U.S. infected with the Texas Fever Tick.
Mo. Agr. Expt. Station.

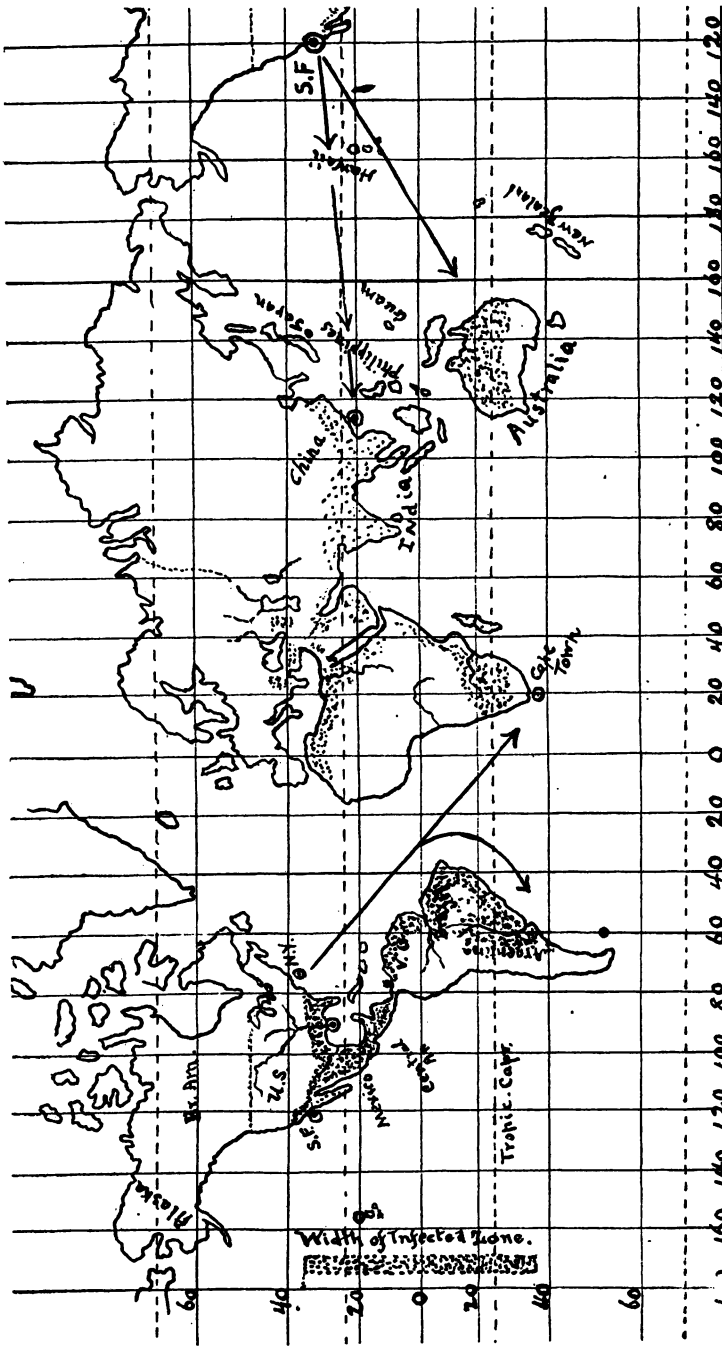
tion as a cattle raising State, and as a market for the best breeding stock that you can raise. But outside of that State in addition to Oklahoma and the Indian Territory, lying to the north there is a vast stretch of infected country lying to the east comprising, either wholly or in part, the states of Arkansas, Louisiana, Mississippi, Tennessee, Alabama, Virginia, North Carolina, South Carolina, Georgia, and Florida; ten states that many of you have hardly thought of as a market for pure bred cattle. But if the inquiries that have come to me from stock men in all of these states, in regard to inoculation against the fever, is a safe index of their interest in fine cattle, then this territory is destined to become an excellent market for pure bred bulls. Many of us had come to look upon that section as solely a cotton raising country. But we must remember that cattle feeding has become an important adjunct to the cotton seed oil industry; it having been discovered that the oil meal and hulls are best

disposed of by converting them into beef. The lesson is also being learned that the most profitable animals for converting these raw materials into a more salable product is the high bred animal and not the scrub —hence the increasing interest that is being shown in a better class of cattle in the states mentioned.

I am confident that it will pay you to cultivate trade in that section, and I am sure you will find inoculation a valuable aid.

In the matter of foreign markets, it may be that the most ardent expansionist among you will not soon seek trade on other continents, yet it is not improbable that cattle breeders of other countries may come to you. The fame of the "Missouri Mule," you know, has spread abroad into all the world—why not then that of the more lovable and more serviceable Shorthorn, Hereford and Angus that are raised on the same soil? I am sure that members of this Association have raised on their Missouri farms far better bulls than some that they or their friends have imported from the little isle across the sea. So far as quality is concerned there is no reason why Missouri should not export a well as England. I present a map to show you that the large cattle raising countries on other continents are about as accessible to you, so far as distance is concerned as they are to the breeding districts of England. Why should you not supply some bulls to the ranches of Argentine, Brazil, South Africa and Australia? These countries are infected with "fever ticks" and many of the imported animals die from the fever. We would expect inoculation to remedy this latter difficulty in the event of our breeders developing trade in those parts.

In addition to the countries mentioned above, the zone of infection includes our new possessions, Hawaii, Porto Rico, the Philippines; as well as Mexico, Cuba, the Central American States and Southern Asia. It is not in my province to forecast the development of the cattle industry of these infected countries, I simply wish to point out that however large or small your trade with these countries may be, you will have to reckon with the "tick fever" problem.



Map of regions infected with the Texas Fever Tick "Boophilus Boris" (Riley-Curtice) and zone favorable for permanent infection. —— Missouri Agricultural Experiment Station —— S.W.C. ——

State Sheep Breeders' Association.

Friday, December 14th, 9 A. M.

Reported by Miss Snowdon Willis.

House called to order by the President, Hon. N. J. Colman.

Gov. Colman—Gentlemen, the hour of nine has arrived when the State Sheep Breeders' Association was to be convened. There are not as many present as I would like, but if people will not come they can not expect to enjoy the feast. The first paper on the program is:

SHEEP AND WOOL FROM THE STANDPOINT OF A COMMISSION MAN AND BREEDER.

By Col. A. J. Child, St. Louis, Mo.

The caption of this article as it appears in the programme, should be slightly amended, so as to read "a former breeder," but the writer having been in close touch with several hundred wool growers since the time he *was* a breeder, may almost claim to be yet one of that important fraternity.

Since the first importation of the Merino Sheep from Spain, in the last years of the 18th and the early years of the present century, sheep husbandry has had a marked influence upon the character of communities—morally, intellectually, and financially, which we believe has not been as fully recognized as it deserves to be.

The writer once heard a man of intelligence in Ohio, give expression in an impromptu manner—expressive of the above claim; he said that wherever you find a man or neighborhood of sheep owners, you find good, clean farms, good and neat farm houses and buildings, with books

and papers in the homes, well educated children and respected and self respecting men and women.

The writer would not like to give publicity to the whole of the comparison made by the aforesaid man, but may say that it gave quite the highest rank to the sheep breeders, next in the scale to cattle growers, next to swine growers, and lastly, to the tobacco growers, giving the characteristics and environment of each class as he had found them.

The Spanish proverb, that "The sheep have a golden hoof" is worthy of acceptance by the American people, for without its sheep and their contribution to our food and clothing, we can not conceive of such National development as the present century has shown. American sheep husbandry yet owes a monument to the memory of Hon. Wm. Jarvis, who as an American Consul in Spain, had the spirit and foresight to take advantage of the troublous conditions there, which made it possible to secure large numbers of Merinos, which for hundreds of years had been the exclusive property of sovereigns and nobles, and send them to the United States, where their descendants in purity of blood and its various grades, make up the bulk of our domestic wool product, and from which country its improved animals have been largely disseminated to the remotest parts of the world.

While sheep husbandry has had its ups and downs, no other calling has been exempt—and we believe it can be demonstrated, that no other department of animal industry, or other calling attaching to agriculture has been so uniformly successful as sheep husbandry, followed with intelligence through a succession of years.

There is a certainty of returns which does not attach to other lines of breeding, particularly in the fact that a sheep which one has raised can not die in debt to the owner. The value it has given in fleece, or perhaps lambs, or the skin upon its back, will pay for all or more than it has ever consumed, in case of accidental or other death. Try the application to the untimely death of any other domestic animal and see if it will hold good.

This article while naming and giving prominence to the Merino sheep as pre-eminently the wool producing breed of this country and the world, does not overlook the fact that the other breeds of sheep have contributed very largely to both the food supply and the wool product, and have added largely to both individual and national wealth, and that

under many prevailing conditions, they may outrank the Merinos for profitable breeding. The appetite of the people for choice mutton and "Spring Lamb" is on the increase, and both demand and prices break the record, and the demand is reasonably sure to continue.

Doubtless many millions of wealth would have been added to the State of Missouri, if it could have had an intelligent Dog Law, for the last thirty years.

The writer, for a good many years made exhibits of sheep at Missouri and other Western Fairs, and heard hundreds of men say they would be glad to have sheep, the most of whom said also that they had tried it from one to three or four times, "and the *dogs* beat them every time."

It seems a pity that a scrubby class of people, who can not properly feed, clothe and educate their own children, should be allowed to keep an unlimited number of hungry dogs to discourage sheep husbandry which adds essentially to taxable wealth and public welfare generally. The strychnine which the ranchmen lay out for coyotes, should be more largely used for vagrant dogs, and public opinion should be educated up to the point of anti-dog legislation. We trust the forthcoming Census Report will give us the figures showing the national loss from worthless dogs.

The relation of sheep and wool is so close that each subject naturally laps into the other. We are satisfied that the total number of sheep in Missouri is less than one-half the number in the State fifteen years ago. The flocks once so numerous all through Kansas, are now "few and far between" and we have to go to Texas, New Mexico, Colorado, Utah, Montana and Idaho to find the large flocks and the main base of domestic wool supply.

The wools from the different States have such distinctive characters that any good wool man, at a wool center, can locate them at sight. This is not necessarily because of a difference in grade but generally from its condition, for color, shrinkage, and handling.

The great bulk of American grown wools are of medium length, and may be grouped generally as "clothing wools"—the other principal sub-divisions being "Delaine," "Combing," and "Braid," with many other sub-divisions known and employed by the manufacturers, as "3-8 and 1-4 blood combing," "3-8 and 1-4 clothing," "1-2 blood combing,'

"1-2 blood clothing," "X and XX," in making close selections for a perfectly uniform fiber, for length, strength, fineness, etc., adapted to a given style and quality of goods.

A wide diversity of wools is produced in the United States from the various breeds of sheep and their crosses—adapted to nearly all lines of domestic manufacture, although nearly all of the carpet wools used are imported. The bulk of imported wools, other than for carpets, is from Australasia, not because of its superiority to much of our domestic wool, but from the different manner in which it is handled, and put upon the market.

The sorting and grading of the Australian wools, is such that the woolen manufacturer can procure at the London sales a perfectly graded, uniform lot of wool, exactly adapted to his need without the trouble and cost of re-grading, and without having any odds and ends not fitted for his use, to dispose of. This is an attractive feature to woolen mill people.

Domestic wool is graded after a fashion in all of our cities, by the dealers, but it is only into fleeces of uniform character; but these fleeces must be again sorted or sub-divided by most of the manufacturers, to get the uniformity of the Australian, and as American factories are getting more and more into single lines of goods, requiring uniformity of wool, instead of several lines of goods which admit the use of various grades, the popularity of the Australian system of sorting and grading is doubtless on the increase. This system might be employed by some of our large flock owners who could afford to have one or more expert sorters at shearing time, but we think it improbable that this system will ever generally prevail in this country.

In the consideration of wool prices, it may be stated that the general expectation as to the benefit of the Dingley Tariff as affecting wool prices, has not been realized; but when present prices are compared with prices of the Free Trade period, the benefit of the present tariff is effected by other elements; first among which was the enormous and unprecedented importations of foreign wools just previous to time the present tariff went into effect. The amount of such importation was said, upon very good authority, to be equal to the needs of American manufacturers for two years. This wool added to the large and yearly increasing domestic product, could have no other effect, while it was

unconsumed, than to depress the legitimate price of American wools.

Manufacturers have doubtless found it more difficult to raise the price of goods as wools have advanced, than to cheapen production; and in this direction, two other elements have conspired to lessen the demand for honest wools. These are *cotton* and *shoddy;* every pound of which used in combination with wool, may be said to displace the same number of pounds of new scoured wool; and while it would be impossible to get accurate data as to the use of these two substitutes, the very largely increased use of both is a well known fact.

The free wool period in this country demonstrated that without tariff protection, domestic wool growing must be practically destroyed. The conditions under which foreign and competing wools are produced, viz.: cheap lands, cheap labor, low taxes and cheap transportation, do not occur jointly in any part of the United States. The above named conditions are found in Mexico, and the Argentine, on this continent, and in Australasia, South Africa and other parts of the world where wools are largely produced.

The writer had a large shipment of Mexican wool of medium and carpet grade, with some Merino grade wool, which latter sold at 18 cents per pound. The shipper, a very intelligent American, was in St. Louis and assured the writer and others, that in the State of Durango, Mexico where he then lived—an unlimited extent of as fine grazing land as could be found upon the American continent was "begging a buyer" at 10 cents per acre; that the average wages of able bodied men was 25 cents silver, per day, and that the regular price for shearing sheep, was 1-2 cent each or 50 cents per 100 head. This is given to illustrate what has been said above relative to the conditions in some of the competing countries.

These foreign conditions being essentially permanent, it is safe to predict that under the present, or any wool tariff, which we may have, the foreign grown wools will practically regulate the price of domestic wool, and it is probable that we have found about the level at which prices will remain under the present tariff.

American grown wools will become more popular when the growers realize that trash and filth are not salable at clear wool prices. It is a matter of regret that so great a number of clips are what we call "nigger handled"—showing no care in shearing, to keep the body of

fleeces whole, to tie in neat and shapely fleeces, to avoid the use of binder twine, and best of all, to clear pastures and ranges from all manner of burrs. When the majority of our wool growers study to prepare their clips, *honestly* and in the most attractive condition, it will do much toward lessening the competition of foreign grown wools in our home markets.

SHEEP FEEDING IN MISSOURI.

By J. H. STARR, Centralia, Mo.

In feeding sheep I find that it is necessary to start right, the same as in any other business. The first thing a feeder should know, is, has he proper protection for sheep, such as sheds or barns for bad weather. Sheep can not stand cold rains, or sleet, for winter feeding. I am an advocate of well ventilated sheds or barns, whether it is feeding for market, or breeding purposes. Unthoughtful people suppose a sheep's wool always keeps the sheep warm, but such is not the case, when sheep are allowed to be out in the rains and it turns cold which is usually the case from November until April they chill and take violent colds and lung troubles follow. You will lose some, and others manage to live but your flock will have many thin unhealthy sheep while others more fortunate, in standing the winter blasts are ready for the market.

It is a mistaken idea to think that you should depend principally on corn for fattening sheep, you should use plenty of bright sweet roughness such as clover hay, sheaf oats, mixed hay, millet, and there is nothing superior to corn fodder or hay cut from new meadow with plenty of weeds in it, for sheep are fond of weeds, and never fail to eat all such feed. This roughness should be given in racks or mangers and not too much at a time, but often, so as always to be fresh and bright and not allowed to become stale or unclean. When feeding sheep all the roughness they will eat I find one pound of corn per head a day is plenty for lambs or yearlings, but aged sheep should have a little more, one and one-fourth pounds. I find that it takes from 90 to 120

days feeding to make sheep fat enough to command the top prices when they go to market.

The corn rations above are for the first 60 to 75 days, and after that increase the corn to what the sheep will eat which will be from one and one-half to two pounds per head per day, but always give all the roughness they will eat. Experience shows that sheep fed in the above manner from start to finish gain as much and are as satisfactory, to the killers, as sheep stuffed with corn and little roughness. So it is evident that we should adopt the cheaper plan. There is one more thing most essential and that is there should be a good supply of pure water. Sheep on dry feed drink several times a day, I have known pet sheep that would drink two or three gallons of water in twelve hours. I am an advocate of feeding sheep on grass where the owner is so situated. Should you want to make an early feed to market your sheep in December or January, commence to corn them in September. The grass will likely do them good until the middle of November or first of December and by commencing the roughness when grass begins to fail your sheep know no change, or if you wish to feed for late spring market and clip them, do not feed much grain in early winter, but plenty of roughness, and commence corn in January or February. As soon as warm in April, clip and let them have thirty days grass, with all the corn they will eat. I will close by saying, any man can be a successful sheep feeder, if he will have protection from storms, feed bright sweet feed, in clean places, good water and exercise care.

FITTING SHEEP FOR MARKET.

By Prof. H. R. Smith, Agricultural College, Columbia, Mo.

This question of "Fitting Sheep for Market" is one which has been discussed time and again and very likely much of what I have to say has been said by others in former meetings of this association. This is the first meeting of the Missouri Sheep Breeders' Association that I have had the pleasure of attending so I hope you will pardon me if I get on old ground already well trodden.

My observations in sheep feeding have all been made on a stock

farm in Southern Michigan and at the Michigan and Wisconsin Experiment Stations. I have not been in this State long enough to become familiar with Missouri conditions. I think, however, what is true in the Northern States will for the most part be applicable here.

In feeding sheep for market we must consider above all else profits to the feeder. It is not probable that many of the sheep men here feed for pleasure alone. This is an important feature of sheep farming but we Americans are too practical to look to much else but the money side of an industry.

To feed for the greatest profit we must give attention to breed, food, shelter, care, and age when marketed. In years past when wool brought a fairly good price we often kept sheep on the farm until they were two or three years old; now we are feeding for the mutton with little regard for the wool. It would hardly be profitable to keep a sheep one whole year just for the wool clip and possibly a little growth on the animal. In considering the age question we find sheep different from cattle in this respect. Sheep are worth much more per pound when under one year; usually at least one cent. Beef cattle bring the highest price per pound when almost three years of age unless sold when very young as veal. In cattle feeding we continue the feeding process until we get the animal sufficiently matured to bring a good price. There is no sudden drop in price when the steer reaches a certain age as in sheep. Nevertheless all cattle feeders realize that there is more profit in marketing steers when two years old rather than older, not because they are worth more per pound but because they make larger gains on the same feed. The same is true of sheep and more than that the sheep under one year bring much more per pound.

Treating this question then from the standpoint of maximum profit we must limit it to sheep under one year, in other words lambs.

In the writer's opinion the feeder will derive the greatest profit by growing his own lambs. Lambs cost on an average of $3 per head just after weaning time. Certainly it does not cost $3 to keep a breeding ewe one year.

In discussing rearing lambs for market I must not take the time to go far into the breeding question. The ewes should be kept in a thrifty condition, not fat, and should have plenty of exercise. Only a small amount of grain is needed. Corn should be fed very sparingly

since it induces fatness. It is claimed and is probably a fact that ewes well fed and gaining flesh when bred give birth to a larger number of lambs.

The kind of sheep raised should be determined largely by local conditions. Any of the mutton breeds will give satisfactory results. Probably for this section the Down breeds are preferred.

The importance of a good sire can not be over estimated. He should be selected with reference to good mutton qualities, such as good size, symmetrical and compact form, wide straight back, thick and wide loin, good leg of mutton, full twist, deep wide chest, fine bone, etc.

Lambs grown for the early market should come in February or early March. At this time of year proper shelter is important. Lambs for marketing in winter might better come in April when the ewes can get plenty of grass and the weather will be such that none will die from being chilled.

It would seem that in this climate no branch of farming would be more profitable than growing February lambs to be marketed the latter part of June or fore part of July. During the past three years the best prices have been paid at about that time of year. In 1898 the highest quotations in Chicago were $7.50 in May, to $6.85 in August, making a rapid decline in September, reaching $5.25 in December. In 1899 prices were as follows: January and February $5.10; March $5.25; April $5.90; May and June $6.75; July and August $7; September $6.30; October $5.25; November $5.35; December $5.75. This year prices were high all through late winter and spring and in July sold as high as $6.50. Since then there has been a gradual decline until now they are quoted at $5.50. To prepare lambs for the early market the treatment would be as follows: If the lambs are dropped in February the ewes should have some succulent food, as corn silage or roots. If neither are to be had feed material rich in protein, as oats, bran, clover hay or pea hay or alfalfa. This will furnish a good flow of milk and will give the young lambs a good start. After two or three weeks the little fellows can be induced to eat a little corn meal, bran, and later, oats. A creep should be provided to keep ewes away from lamb troughs and grain should be put in fresh each day. Just as soon as there is grass all should be turned out. The lambs will be old enough to readily take care of the increased flow of milk and

will also be glad to continue the grain feeding. Under this treatment very rapid gains will be made so that when they reach the age of three months, about May 15th, will weigh in the neighborhood of sixty pounds. If, at this time, the pasture field is too small for their needs, a very excellent plan would be to have a field of rape ready for use. No crop will furnish a larger amount of succulent and palatable food for sheep. In this State the rape can be sown April 1st and will be ready for pasturage by May 15th. Care should be taken at first that too much is not eaten. Old sheep, especially, eat it very greedily when first turned on and sometimes die from bloating if not removed from the field after a few hours of feeding. Grain should be fed to lambs just the same as before, perhaps two parts of corn to one of bran. Rape is rich in protein and the corn will supply the carbohydrates. Bran will be beneficial because it counteracts the scouring effect of rape. By June 15th or July 1st the lambs will be in prime condition for marketing and will be out of the way before the coming of extremely warm weather, which is a very unfavorable condition for sheep growing. The light lambs should be culled out and continued on rape during the remainder of the season.

Late lambs will grow very nicely on rape during the late summer and early fall months when pastures are often dry and scanty. Fairly good gains are made on rape alone but better results are to be had by providing grain or pasture in addition.

Lambs fed on rape in the fall feed well and make rapid gains on winter rations. In an experiment at the Wisconsin Station rape was compared with blue grass for fattening lambs. Those fed on rape not only made more rapid gains while on rape but also made the best gains on same food in winter quarters. On our farm in Michigan we have grown rape three years with good success. We have had but few losses from bloating. This year we lost one lamb out of a flock of three hundred and forty-three, probably from eating too much rape. Three hundred and nine of these lambs I purchased in Chicago, August 1st. They had been shipped from Idaho and were a fairly even lot of feeders. Their average weight when purchased was sixty-three pounds and they cost $4.65 per hundred in the Chicago yards. They were turned on a field of about sixteen acres of rape and were allowed the run of an equal area of rather dry pasture. About one third of this field was

marsh ground which had been tile drained the fall before. The greater part of the remainder had never before been plowed. One object in sowing the rape was to subdue the old sod, especially the marsh sod. Rape will do this admirably when sown broadcast.

The lambs fed upon this rape during the months of August, September and a part of October without grain. About October 15th one deck load averaging eighty-seven pounds were shipped to Buffalo. The market was not good and they brought about $5.50 per hundred, only a little below the top of the market at that time. From this time on the others were fed a small allowance of grain. They were placed in confinement in November and made excellent gains. Figuring these at five cents per pound their market value when taken from the rape field, deducting the price of grain fed while on rape and the value of grass pasture, the flock of three hundred and forty-three made a profit of $250 on the sixteen acres of rape. This was not a large profit, but it was made on a declining market such as would allow no advance in price per pound for the better finished lamb. There was no expense in harvesting and feeding the rape. More than that, the manure from the crop was already drawn and well spread for the next year's crop without expense.

The experience at the Missouri Experiment Station has not been favorable to rape until this year, when it was sown early in the spring and furnished an abundance of food the whole season. The crop uses a great deal of moisture and must be sown when the ground is fairly wet.

In winter feeding considerable attention should be given to housing lambs properly. A barn basement is not suitable because it is too warm and often damp. Fattening sheep require a cool dry air and one always fresh. Barns are apt to be poorly arranged for giving proper ventilation. A board shed with a water proof roof and sides of unmatched lumber gives excellent satisfaction. Several experiments have been conducted to show the relative effect of feeding in closed barns with but few windows, in sheds fairly open, and in the open yard without shelter. In every instance the sheep in sheds have made the best gains on same amount of food.

The shed should be placed on dry ground and should have a southern exposure. Feeding pens can be arranged on south side where

plenty of sunshine can be had and at the same time protection from the north winds afforded.

Some advocate giving each sheep about ten square feet of space and keeping them indoors at all times. Sheep like everything else do not enjoy close confinement and while I do not advocate a large run I believe that an outdoor sun bath on pleasant days is conducive to better health and better gains. Of course, exposure to stormy weather should be entirely avoided.

In the matter of feed we have here in Missouri all that is necessary to make a well balanced ration and one that is palatable as well as economical. With plenty of good corn, oats, clover hay and possibly some bran, we do not need to import oil meal, linseed or cotton seed meal. The English feeders use roots largely because they don't have the corn. While roots are relished by sheep when we take into consideration the labor of growing and feeding them they are less economical than corn. The best daily gains (1.38 lbs.) on different rations were reported by the Wisconsin Station. In this instance the ration was equal parts of shelled corn, oats and clover hay. I find in this ration the ratio of digestible protein to carbohydrates is about 1.7. In all experiments to determine the relative value of different grain rations nothing has been found superior to corn for fattening quickly.

The amateur feeder should be careful not to feed heavily with corn on the start. It is perhaps safe to feed liberally with oats and bran in conjunction with corn on the start gradually increasing the proportion of corn until just before marketing, it may be three-fourths corn. Shelled corn, and clover hay *ad libitum* will give excellent results. Even though a full feed of corn is given, the sheep will eat enough clover hay to counter balance with protein the carbohydrates in the corn. If the clover hay is prime, not over ripe and well cured, they will balance their own ration in a very successful manner.

Ordinarily 500 pounds of corn and 400 pounds of clover will make about 100 pounds of mutton. Figuring corn at 35 cents per bushel and clover hay $5 per ton the cost of 100 pounds of gain will amount to $4.15. Estimating the manure as equal in value to the cost of the labor we find profit in feeding when the market price is above $4.15 per hundred.

Burnett of the Nebraska Station found in a feeding trial last

winter that the greatest profit was obtained on a ration consisting of corn and alfalfa hay. Clover was not used in these trials. There is little difference in the nutritive value of clover and alfalfa. Burnett found that each lamb fed on corn and alfalfa made a net profit of $2.05. These lambs were purchased in November at five cents per pound and netted $6.35 at home the following March. The big advance in prices toward spring last year contributed largely to the enormous profits obtained.

All experienced feeders recognize the importance of proper care in handling sheep. No farm animal will respond quicker to good care and attention. The amount of water needed will depend largely upon the ration fed. With roots or other succulent food little is required. It should be kept before them, however, at all times and the troughs kept clean.

Sheep are naturally very nervous and easily startled. The sudden appearance of the attendant without giving notice of his approach to the flock at some distance away will often cause a stampede which will cause a loss of several pounds of flesh on the whole flock. Dogs are a nuisance around sheep. Lambs will not become so accustomed to a dog as to be unmindful of his presence.

In culling out sheep it is not uncommon to see them caught and held by the wool which pulls the skin away from the flesh where held. It is even more common to see them captured by one hind leg resulting in a jerking movement which relieves both man and beast of several pounds of flesh. When necessary to go into a flock of sheep the easiest possible way to catch and hold them is to grasp the flank by either hand. In this way they seldom ever struggle to get away.

The proper time to market lambs has to be determined by the condition of flesh and not the size. One year after another it does not pay to hold for higher prices when they are once ready to go. If the feeder has the capacity of foretelling a better market he would better sell out those that are already fat and replace with good growers.

While the markets just now are somewhat depressed future prospects seem to be good. The country is not over-stocked with sheep and the people are more and more forming the mutton-eating habit.

The mutton industry has been profitable in the past and there is no reason why it should not continue so in the future.

THE FUTURE OF THE MERINO SHEEP.

By L. E. SHATTUCK, Stanberry, Mo.

In an association of this kind we may discuss the merits of sheep, and no doubt the members will think it a dry subject. But Merino sheep, those little greasy, dirty looking things, why spend our time talking about their future? Because for the *average* man they are the most profitable sheep in existence. True they do not look as large and beautiful as the English breeds, the wool does not look as clean, but let one be caught and the wool opened and what a surprise for the novice! As a people we are inclined to be superficial. We take up with that which first presents itself to the eye in a favorable way; hence the popularity of the English breeds with their loose, fluffy looking fleeces. To the thinking man who investigates, the Merino will always be a popular breed under ordinary farm conditions, the range, and for the exclusive production of wool. Such a man finds the Merino growing an abundance of wool where on corresponding parts of the English breeds the skin is a bare waste. He finds the fibers growing closer together, the fleece more compact and well supplied with oil that preserves its good qualities. The Merino is found to be the hardiest of all breeds and will stand the greatest changes in climatic conditions with least evil effects. It will therefore naturally make the greatest returns with least care. As a breed the Merinos are the oldest and most prepotent of all. Their history runs back into the early centuries. They abounded in Spain before the Christian Era. They marched triumphant into France and Germany. They crossed the Atlantic and stamped their good qualities on ninety per cent of all the sheep now in the United States. As long as large bands of sheep are run on our great grazing ranges of the west, so long will the Merino be in good demand, for no other sheep will herd as well and as profitably. As long as our neighbors in Mexico have cheap grazing lands to be stocked with sheep, so long will the Merino be in demand. As long as there is a demand for the fine wool cloths, dress goods and underwear (and there is no likelihood of such a demand ever ceasing) so long will Merino sheep be in demand, for *no other* breed of sheep grows fine wool. We find different breeds growing coarse wools, and several growing the

medium wools, but when it comes to fine wools the Merino sheep has a monopoly. Its future is assured. Yet like all well bred animals, it is undergoing a change.

The Merino of the future will be a good square blocky sheep and smooth, with a first class constitution and plenty of wool, but not the extreme heavy fleece that the wrinkly sheep of the past carried. Wool is purchased on a scoured basis and we want sheep with a large scoured fleece not a large fleece excessively loaded with grease and dirt that weakens other qualities.

THE PREJUDICE IN MISSOURI AGAINST MERINOS.

By Geo. W. Hamilton, Fulton, Mo.

I shall not deal with statistics. All the world knows that we do not produce nearly the wool we use and that at the present rate of increase of wool and increase of demand by our prodigiously increasing population it will certainly be many years before wool-growing can equal requirements, much less over-do production. Ditto, as to meat—mutton. The growth of the appetite for mutton has been a remarkable thing. Only a dozen years ago a daily run at Chicago of 8,000 to 10,000 head would have amply sufficed; now, double that number is required. Up till November 1st, last, Chicago alone had received in this year over 3,000,000 sheep, and the four principal meat-markets received in the month of October alone 742,117 sheep. Chicago received in October in gross pounds of sheep 28,000,000 pounds. And besides the tremendous growth of the American requirement, Great Britain's production of mutton is decreasing, her demand also increasing, and we shall therefore have a constantly increasing amount to produce for export. So, the sheep business in the United States is a fixture, permanent and safe upon a solid basis—a sure thing both for mutton and for wool—and fortunately, free trade, the only danger, has been tried and will never trouble this generation again. Cattle may prove unremunerative, horses and mules may be doubtful, hogs may be ravaged by cholera or drop to an unprofitable price, but sheep are a *double certainty* because of the intrinsic and independent value of mut-

ton; while the animal itself will grow, by day and by night, instead of worthless hair or bristles, a fleece of wool that will certainly pay all expenses.

I shall not enlarge upon the business itself, as being quiet, peaceful and pleasant. It has been dignified by the Book of Books as the chosen profession of the patriarchs whom God loved—Abraham, Isaac, Jacob, Job, Moses and David were called from the flock to become the Heads and the Leaders of God's people. The blessed Savior himself has glorified it in his parable of the sheep, and the sheepfold, in calling Himself the Good Shepherd, and the Lamb that was slain from the foundation of the world.

There is something in one's business of which one partakes. The cattleman can almost be recognized by traits which in some way beyond description, but quite recognizable nevertheless, indicate his acquaintance with the sturdy herd of cattle. The horseman has spirit, and gusto, and vim, and action, that indicate his craft. The hog man—but the subject is becoming painful and I refrain from following the parallel farther.

May I be indulged in a little, that is personal? On the shady side of fifty—after a life of such cares and sorrows as have dissipated dreams and sobered life to the exclusion of all save daily duties, daily done, may I not be allowed a moment of personal reminiscence? It is necessary that I should speak thus to give deserved force to what I desire to say. When I was a boy it was the time of the Great Civil War. There was intense interest and activity in sheep in my native county—the greatest sheep county in the United States, Washington county, Pennsylvania. Wool had soared to $1 or even to $1.25 a pound, and meat and stock values ruled in proportion. Every farm was a sheep farm; there were 450,000 sheep in that single county by the census of 1880. We lived adjoining the town of Washington; my father was one of the largest dealers, and as his eldest son, I was inducted early into sheep handling, sheep driving, and sheep shipping. From that time till now I have been engaged in the business. I have driven sheep, a boy, through the streets of New York, before the yards of Communipaw, New Jersey were dreamed of. I have also driven them in Philadelphia, Baltimore, Pittsburg and Alleghany City, Cincinnati, Columbus, Wheeling, Virginia, and Austin, Texas. I was in

New York with sheep at the time of the New York riot and had sheep burned in the Bull Head at that time. I sat, a boy, with sheep, on a car top in a sea of side-tracked cars at Harrisburg, Pennsylvania, when the Gettysburg battle was raging not far away, and saw the hospital trains of the Government go by with the wounded for the New York hospitals. I lay in the rain the last half of one stormy night badly hurt and unconscious beside the track at Phillipsburgh, New Jersey, still shipping sheep, and I have sheep-ranched in the solitude of Texas amid the fire-flies of the southern summer nights on the Gaudeloupe, Neuesces and Devil rivers, and in winter have heard owls hoot perched upon our tent-pole, or have dressed hastily when the wolves were stampeding the sheep and making them break down the corrals. I have trudged on foot behind sheep across the Alleghany Mountains down into the valley of Virginia, put sheep out on the shares in Ohio, Indiana and Kentucky, and sold sheep for several years as a commission salesman in East Liberty Stock Yards, Pennsylvania. So, I have handled a good many sheep, been with them for a good many years, and *always* the sheep have been *Merinos.* It may be that I am prejudiced in their favor, but surely I have more than a mere superficial knowledge of their good qualities.

My subject is *The Prejudice in Missouri Against Merinos.* I have said the prejudice in "Missouri" advisedly; for, wherever sheep-raising is followed extensively, wherever experience and practice have raised it to the dignity of leading all other businesses, wherever men engage in sheep-raising with all their capital, and with all their sense and might, wherever—if you please—it is the *"Paramount"* business, and men are successful and prosperous because of it, the kind of sheep used, or at least the *dominant* kind, is *invariably the Merino.*

This is a startling, staggering statement, but it is true; and it should make a man pause and do some thinking to find out the reason. It is one of those universal, significant facts that ought to make a man overhaul his prejudice, if prejudice he has, against the Merino. For Australia, Cape of Good Hope, Argentine Republic, Texas, California, Montana and Colorado sheep men are not in the business for their health, nor for sentiment, but for profit—profit in mutton and wool.

I have no fault to find with the Shropshires, Southdowns, Cotswolds, Lincolnshires, Dorsets, Oxfords, Hampshiredowns, etc., etc.,

none at all. They're well enough as a diversion; well enough for the man who wants a dozen or so, or who considers sheep an insignificant little adjunct to the main business of his farm. They're all right, too, for early lambs, but raising early mutton lambs is nearing its limit and is becoming a bit precarious and doubtful. I am speaking altogether with a mental vision of what Missouri *could do,* and *could be,* and *could become,* if men were to go into the sheep business in earnest, as has been done in great sections of Eastern Ohio, Western Pennsylvania, West Virginia, Michigan and other states. What a change there would be in the brush that keeps *worthless* thousands and thousands of acres that surely were created for mutton and wool. What a change in the resources of farmers, who are crowding and competing, restricted to cattle, and hogs, and laborious farming! What a change in bank accounts, and in leisure and rest, so scanty now!

I think that the reason why the Merino is the chosen money-maker is not hard to find. The Merino is hardy, healthy, easy kept, long-lived, and so social that they herd and company quite compactly, and are pre-eminently adapted to easy and successful management. Each one of these items, if examined, will be found to be immense, and embodying in itself an essential element of success.

True, they are not so *large,* but what merit is there in *size* in this matter? It takes as much grass or feed to keep the big 200 pound Shropshire ewe as it does to keep 200 pounds in two Merino ewes. As much; no more, no less; as experiment has demonstrated. Now note this: *You* have the *one* 200 pound ewe, and you obtain *one lamb and one fleece. I* have the *two* 100 pound ewes, and I obtain *two lambs and two fleeces; and each Merino fleece and lamb under normal circumstances is quite equal in value to the single one obtained by you.*

And therein lies the *difference* and the *secret.*

Prejudice *against,* means a bias against. Prejudice means *unreason,* and insanity itself means unreason. It is as hard to overcome. In Washington county, Pennsylvania, the prejudice against all other sheep than the Merino is quite as strong as the prejudice against Merinos in Missouri. Of course it is wrong, for prejudice is always wrong; and, as I have said, all the breeds have their value, and none are to be despised. I well remember the introduction of Hampshiredowns from Canada at one period after the war and after the declension in prices.

It was undertaken in the interest of raising of early mutton lambs. My father engaged in it, went to St. Katherines, Canada, and brought in several importations. They didn't last long. The Merino holds the throne there as they have done for seventy years.

The prejudice in Missouri against Merinos, I think, has its origin in sheer indiscrimination, combined with the admiration for big, showy animals, that is a second nature with the growers of fine horses and cattle. Then, too, there is the influence of usage and habit, the willing recognition of big, showy, native descendants of the Downs, or of the Downs themselves, as being SHEEP, and the revulsion of such a mind contrasting and comparing the smaller, dirty-looking and repulsive-to-them, Merino.

An old negro woman, a neighbor of ours, refused to accept what we considered a nice present of mutton, and gave her reason, as she gazed at the flock going by her. Disgust on her face was evidently struggling with her desire not to wound our feelings.

"Dey's nice, dey is, Mr. Hamilton, deed dey is! But dey is'n sheeps! Dey was'n 'tended fo' to *eat;* yo' kin tell dat f'om de way dey *walks! Dey don'* WALK *like dey's fit to eat!*"

Now I wish to state here that I am not attacking the prejudice which exists against the little, measley, ill-shaped and ill-conditioned, thick-skinned conglomeration of wrinkles and grease, scrub of scrubs, and product of in-breeding and neglect—the Scrub Merino. That prejudice is well founded. There is only one kind of sheep more utterly worthless, and that is the scrubs of the other breeds. These last are not seen in such numbers, nor so often, for the reason that they die quicker. The constitution of the Merino is the last thing he parts with, and he lives on anyway.

The Merino I speak for, is—any of the improved varieties: American Merino, Black Top, Delaine, Spanish, Rambouillet, which are accomplishment of such long-continued, careful and conscientious breeding, as, in regard to *constitution, fleece,* and *size,* have produced a practically perfect animal.

I have no sheep to sell and expect no personal benefit from this honest and long-repressed expression of observation and reflection touching the prejudice in Missouri against Merinos. What I have said I believe; and I have said it for the consideration of sane and thoughtful men.

A friend of mine, Mr. C. O. Atkinson, who for several years was steward of the Insane Asylum at Fulton, told me of a patient they had who was a "trusty," and who was sane and even more than ordinarily intelligent on everything but one single point—the fellow believed that he was dead. Mr. Atkinson told me that on one rainy day the doctors of the institution were chatting in the office about his case, when they resolved to try an experiment, believing that if they could convince him of his error they could do him untold good. So they sent for him. "John," one of them addressed him, "will a dead body bleed?"

"Certainly not," he replied, "circulation no longer exists in a dead body, and therefore it can not bleed."

"Would *you* bleed, if we should try to bleed you?"

"I would not;" he made answer, "for I am dead."

"Well, we think we can prove to you and completely convince you that you are *not* dead. We wish to bleed you."

He readily assented to their wish and even seemed to enter into the spirit of their undertaking, and let them bare his arm and get things in readiness, and then watched the doctors apply the lancet.

Of course he bled freely, and they turned triumphantly upon him for signs of release from his mental infirmity. He did, indeed, look puzzled for a moment, but then he remarked:

"Well, don't that beat all! That proves that a dead body *will* bleed."

Prejudice is such an infirmity—whether in politics, religion, in daily life, or regarding Merino sheep; and it is time that rational men should understand it.

A VETERINARIAN'S EXPERIENCE WITH SHEEP DISEASES.

By Dr. T. E. White, Sedalia, Mo.

A request from your president for a paper on this subject has brought forth the following remarks.

As an apology for the meagreness of matter presented I must state first and foremost that my experience with diseases in sheep has been

very limited and I may say also that I believe it can be safely stated that I am not alone in this respect, no doubt but that if it were generally known it would be the same case with most all veterinarians in the United States, no more particularly is this so, we believe with the veterinarians in Missouri.

The reason being a plain one, i. e., that as compared with the great horse and cattle industries, sheep raising especially in Missouri, is still in its infancy, as a natural consequence there are necessarily fewer patients.

There is also another reason not so obvious—namely, that a large proportion of the race of sheep undergoes slaughter before the diseases of senility, or even adultism sets in. Thus few really chronic diseases attract our attention in ovine pathology, and few of those serious changes of the skeleton, circulatory and digestive systems which result from over work and duties too prolonged.

The system of the sheep is not liable to great strain, except in the processes of digestion, resisting extremes of climate and the emergencies of gestation and parturition, the results of these physiological phenomena are of an acute kind in the majority of cases and the low value of most sheep with their utility as human food causes all cripples or slightly diseased animals to be withdrawn from the breeding flock and fattened at once for the butcher or in emergency slaughtered without fattening, breeding ewes and rams occasionally afford interesting pathological conditions, but these cases are rare and can easily be counted.

Of these diseases that come under the heading of *simple disorders* of the blood and that have their origin in irregularities and defects in management, plethora perhaps heads the list. Properly speaking, up to a certain degree this condition can hardly be defined as a disease, but at the same time when a sheep makes blood too rapidly as a result of too high feeding, this high condition must be looked on apprehensively if serious plethoric disorders such as are apt to occur to ewes during pregnancy, are to be avoided.

Parturition fever always affects only the best ewes of the flock, especially if allowed very rich food, near the lambing time and the exercise necessary for its good health, has not been sufficient. In such cases it occurs apparently as an epizootic, but if the cases are investigated it will be found that these enzootics are always due to an absolute

and exact uniformity of conditions whereby the cause may act just as readily on many, as on one.

Another of the blood diseases of sheep, is that of *Anemia, a* condition, while though just the opposite of *Plethora,* is equally if not more frequent among sheep and also arises from mismanagement of various kinds. Anemia occurs when the blood formation is checked by some disease, or when there is a severe strain on the system, for instance, when a ewe is compelled to suckle her lamb on insufficient or innutritious foods; one form of anemia, and I have come across a number of these cases, in my practice, is a dropsy which commences near the udder and often extends to the fore legs; this sometimes occurs, as an enzootic, about a week after shearing but will quickly yield to tonic treatment: The disease is readily diagnosed by paleness of the skin, pale visible mucous membranes, pale tongue and a general want of vigor. The most frequent seat of these dropsical effusions, however, is between the lower jaws.

Dr. Robinson has given anemia of the sheep special attention, and he divides the disorders into two classes—parasitic and dietetic, among this latter class the most important reason he finds, is that of feeding sheep on too uniform a diet.

Another blood disease, but specific in its nature, is that of sheep-pox, or Ovine Variola. This is one of the most formidable plagues of sheep, because it bears interesting relations with smallpox in man and cow-pox in cattle. It is an eruptive fever and very contagious. As it is now conceded that no specific disease originates spontaneously it will be well for the sheep breeder and owner of a flock to be on the lookout for it, since under existing law, in Missouri, it can easily be brought into our State from other states.

I will read you the law copied from the Revised Statutes 1899, volume 1, page 638, section 2330. Importing diseased sheep—"If the owner of sheep or any person having the same in charge, shall knowingly import or drive into this state sheep having any contagious disease, or turn out, or suffer any sheep having any contagious disease, knowing the same to be so diseased, to run at large upon any common, highway or uninclosed lands, or sell or dispose of any sheep, knowing the same to be diseased, he shall be deemed guilty of a misdemeanor. (R. S. 1889, section 3924)."

Blackleg.—As I have never seen a sheep affected with this disease, will only make mention of it, yet in passing I may state, that a year, or two ago I held a post-mortem, on an Angora goat, which had died with black-leg.

Under the heading of *Respiratory diseases,* we have the *Parasitic* disease known as *Ozena* or *Nasal Gleet,* some times called "snuffles" but more familiar to us perhaps, by the term of "Grub in the head." As cases of this class have been somewhat frequent, in my practice, it is well perhaps to give it notice. The snuffles as here applied, differ from the snuffles in catarrh, which attacks sheep, exposed to sudden changes of weather in the winter, whereas the snuffles in nasal gleet, is due to an insect, known as the sheep bot. This bot or grub is produced by the sheep-gad-fly, depositing its eggs in the nostrils of the sheep. In the heat of the day in July and August you may notice your sheep closely bunched, with their heads towards the center of the clump and the noses of every one turned close to the ground, if you shoo them up, they will run away a short distance, but always with their heads still to the ground, occasionally they strike or stamp violently with the feet, as though an enemy was near by; this erratic behavior is due to this sheep-gad-fly, when attempting to deposit her egg in the nostrils. When the egg is once deposited, it is immediately hatched by the warmth and moisture; it then becomes the young grub or larva, gradually it ascends up the nostrils and finally attaches itself to the membranous lining in the sinuses of the skull, it does this by means of the tentacula or hooks which grow from either side of its mouth. This grub or larva remains all the winter in the sinuses of the skull, the next spring when fully matured, it lets go with its tenacles and gradually descends the nose, and drops to the ground, where it rapidly burrows in the earth. In about 48 hours it becomes a pupa, or chrysalis, then in a period of from six to eight weeks a small portion of the head end of this chrysalis becomes detached when it escapes from the shell and becomes the Oestrus-gad-fly of the sheep and is now ready to seek its mate. The descending of this bot from the nostrils of the sheep, causes a great deal of irritation and inflammation of the delicate mucous membranes of the nose and in consequence the snuffles is again produced. There is a very slight mortality practically speaking among sheep from this grub in the head, but if symptoms in the early part of the year should occur, such as

loss of condition, without good cause, such as snuffles or bloody mucus from the nose, peculiar movements of the head, indicating that the head is diseased, it might be well to inject some medicine up the nostrils with a six-inch nozzle family syringe; about a teaspoonful of equal parts of linseed oil and turpentine.

But before treatment you had better examine thoroughly the head of a dead sheep if it is possible to do so, to familiarize yourself, just how to insert the nozzle properly. When a sheep dies supposedly from grub in the head, always make sure that such is the case, by holding a post-mortem on the head.

Since you know the life history of the sheep-gad-fly and its larva, plans and methods of your own may be formulated for the protection of your flocks from the attacks of this fly. My father used to plow furrows here and there in the pasture field for the sheep to hide their noses in the dust and loose ground, and every two weeks he painted the nose of each sheep, with a mixture of tar and fish oil, to ward off the attack of this fly.

The gad-fly is a dull colored insect with stripped wings almost as long as its body, the head yellow, and the abdomen composed of five rings, its back and belly being tiger colored.

Inquiries often come to us with history and symptoms that point strongly to a parasite in the lungs. This affection technically known as Strongylus-filaria or Thread-lung-worm, invades the lungs of sheep. The most commonly received view is, that the ova and embryos are injected with their foods and water, and with the instinct found in parasites of all kinds, select the locality most suitable for their further development—the lungs.

The most susceptible to this, verminous bronchitis disease, are the young animals, those that have become weakened from other parasitic diseases and, the poorly nourished ones. The sheep seem exempt from it in the winter and in the spring time, probably, from the fact that the development of the worm depends on warmth and moisture, it being more prevalent in summer if the season proves damp and warm.

In the first stages of the disease, there are no symptoms by which the trouble is made apparent, except perhaps, in the worst cases. (Some animals being very much worse infected with the worms than others.) By and by, there is a slight but deep cough and if the sheep is driven.

it breathes hard and with difficulty, in other words, is short winded. The appetite seems fair, but the sheep doesn't thrive, and this is perhaps the first perceptible symptom that, something is wrong, the skin becomes dry and harsh (this is why it is known by some, as "Paper Skin"), the wool can easily be pulled off and as the disease progresses, it becomes more and more emaciated and debilitated and if the sheep is closely watched when coughing, the little shreddy masses it coughs up, will be found on close examination, to contain worms.

As the disease makes such headway, before being suspected, a large percentage die, the anemic animal, standing no chance of recovery. Where the animal has a constitution, to resist the disease and the amount of infection is small and if the season proves favorable, there is a chance of recovery, but the growth of fleece is lessened, besides, there being also a great loss of flesh.

My treatment with these cases consists in giving, one teaspoonful of turpentine once a day for a beginning, gradually increasing the dose, as you find the animal can stand it, until you have given four teaspoonfuls at one time; each dose of turpentine must be mixed with from one to two ounces of raw linseed oil.

This must wind up these somewhat desultory remarks, but before doing so, a few words concerning the administration of medicine to sheep, should be given. First. Sheep and cattle as well, are much easier drenched out of a bottle, than either horses or mules.

Experience has also demonstrated that, *oleaginous cathartics* are more frequently useful in sheep than those of a drastic character.

All drenches must be administered carefully and very slowly, so that they may trickle down into the true stomach and not be lost in the ruman or paunch. During the administration of medicine, the head of the sheep should be held by an assistant, who should stand astride of the animal.

As a stimulating tonic for anemia or debility, a half pint of beer divided into two doses and given morning and evening, works good results.

In regard to preventive measures, you have constantly to meet the argument, both concerning parasites and specific diseases, that the efforts of one individual sheep man are useless, so long, as the State remains indifferent.

PARASITES IN LAMBS.

By J. W. Boles, Auxvasse, Mo.

My knowledge of parasites in lambs is limited, yet it may be of some benefit to others. I have had sick lambs, treated them, have saved some while others died. I think that most of our bad luck, as we term it, is neglect of attention to our sheep at the proper time.

In 1898 I lost about fifty per cent of my lambs with what I called black scours, caused, I thought, by so much wet weather. Finally I put them in the barn and began feeding dry feed, which checked the disease to some extent. I saved some puny lambs though they have never been worth much. I then thought I would put all my lambs up in the barn the next summer when I weaned them and feed them through the hot months, just as I would a colt at weaning time. In 1899 I neglected to do this as the lambs were doing so nicely and it took extra labor to care for them. The weather got hot and dry and the shade was poor. The lambs did not eat much during the day so it was not long before they began to have scours as before, but not as bad as in 1898.

I fed a worm powder in salt. I think this partially checked the disease. I put them on dry feed, mixing a little worm powder with the bran and oats, which I gave them.

In a short time I noticed in their droppings a worm resembling a tape worm, though not very long. I am satisfied now that these worms caused the disease with both sets of lambs. The loss was less in 1899 than it was in 1898.

Both these years I fed a few ram lambs through the hot months and kept them in the barn during the day and let them on grass at night. They did well. My ewe lambs in the fall of 1899 were doing fairly well, though some of them were scouring a little. During the last of November I attended a sheep sale of Mr. George Allen's. There I met and talked to many men on the subject of scours in sheep. When I came home I put my ewe lambs in the barn, and after keeping them there from twelve to eighteen hours, I gave them a feed of bran and oats with worm powder mixed in. This I did for about a week; always keeping water from the lambs for two hours after giving the feed. The most of them have done well ever since. I then continued to feed them

until spring. After these worms have once gotten a hold on the lambs they can not be eradicated by the worm powder the lambs get in salt. I have never had a sick lamb that was fed through the hot dry months and kept in the shade until cool weather. Hereafter I want to feed all my lambs as I would any other young animal at weaning time.

This year I put my lambs in a cornfield and a meadow of nice tender grass and young clover to wean them, they had free access to a nice pond of clear water. The weather was very dry and hot; several of them began to scour, caused by eating too much of this tender grass and clover. I was away from home for a week at this time. When I came home I found several of them in bad shape and one or two had died, not from scouring as my lambs had done the year before, but from another disease which was caused by a stomach worm. I brought them to the barn and began at once to feed worm powder in oats and bran and to dose them on gasoline, giving one tablespoonful, each morning for three mornings, in about two gills of warm milk. I gave this medicine on an empty stomach. I turned them on the meadow again and fed them for awhile longer until they began to eat corn in the field. Two or three more died, though some of the worst got well. Just here I made a mistake. I should have kept them at the barn and continued to treat them every day or have looked after them more closely in the field. However, I did get them up occasionally and treat them. It was still very hot and dry.

When the time came to separate the male and female lambs the weather was cooler. I took the male lambs into the barn and continued to feed them; giving them gasoline occasionally. All the lambs are doing well now. I am convinced that it pays to feed lambs from the time they are weaned until the weather is cool enough for them to graze any time through the day.

I believe I would not have lost a lamb had I been at home all the time and had fed them through August and September and had given them a treatment or two of gasoline. I have much faith in gasoline for the twisted stomach worm in the fourth stomach of sheep, but it must be given more freely than is recommended by some of our papers. After my ewes lamb I expect to dose all of them on gasoline or something better and feed them worm powder continually. I do not think I lost a lamb from scours last summer but their death was caused by the effect of worms in the fourth stomach.

To drench a lamb I set it on end, shoulders between my knees, head against my body, with left fingers under chin, with thumb in mouth to open it and a long neck bottle, holding about two gills, in right hand and drench slowly. I sometimes let them stand on all their feet, being careful not to pull their head too far back, for this may cause strangulation.

In April, 1899, I had a ewe to swell under her jaw. She died. I held a post-mortem examination and found three large grub in her head and a thousand, or more, very small thread like worms in what I supposed to be the fourth stomach. These worms were a dark reddish color. The contents of this stomach was a dark watery substance. I think the grub killed the ewe. The inside of her front head was eaten out and the cavity was filled with a thick yellowish matter. I put two of the grub in a small bottle of whiskey and corked it tightly; they wriggled for an hour or more before they died. I put a few of the small worms in some disinfectant which seemed to have but little effect on them.

The fall of 1899 I had several ewes affected with a disease which caused them to walk stiff, tremble, lie down often and bow in their backs. I brought them to the house and fed them bran and oats and worm powder. They got better, passed through the winter and seemed to be doing very well. When the hot dry weather came last summer the same disease attacked them again. I dosed them several times on gasoline; they got better and are thriving. I am sure the stomach worm is the cause of the disease.

I had another ewe to swell under the chin. I gave a few doses of gasoline and injected some disinfectant into her nostrils; she got well. I go over my sheep occasionally injecting into their nostrils this disinfectant, after weakening it. I also put tar on their noses in summer.

Mr. W. R. Turner, of Shelbyville, Missouri, told me he gave for cough in lambs one teaspoonful of turpentine in a little milk or warm water every morning for ten days. He also said when he weaned his lambs last summer, he turned them on about fifteen acres of rape and fed them a little ground corn and that they did extra well.

Now if I have the wrong conception of the disease of which I have spoken, I hope some of you gentlemen will correct me.

STOMACH WORMS IN LAMBS.

By J. E. Muir, Hatton, Mo.

There has been much written on this question. I have had considerable experience with parasites in lambs.

In 1897 I lost twenty-seven out of forty. This was my first experience with stomach worms in lambs. I have been troubled ever since with them. Turpentine was about the only remedy I knew. I gave it very freely, yet they died, causing me to lose faith in this remedy. I think the fumes of turpentine get into their lungs too much and that it effects the kidneys the same way.

I have tried several different remedies. I have more faith in gasoline than in any other that I know, provided it is given as I have given it. It may be sufficient to give a dose a day for three days and skip three days when a lamb is in the first stage of the disease, but after the disease has run on for sometime I think it takes more. I give two doses a day, one in the morning and one in the evening, always giving on an empty stomach and keeping water from them for two hours afterwards. I burned the lambs I lost in 1897. While burning the intestines would burst from which I would take worms that were from one to one and a half feet long. They looked like tape worms. I think now that tape worms were the cause of the death of my lambs and that the tape worm causes black scours.

I do not believe the twisted stomach worm causes black scours. I had one lamb in 1897 that had the stretches. It would stretch out as far as it could, then it would lie down and when it was up it would stretch the same way. I gave it a dozen doses of turpentine or more and it got well.

In 1898 I lost fifteen out of thirty-five. In 1899 I lost six out of twenty-four. In 1900 I lost two out of twenty-five. During the last two years I used a worm powder in salt very freely and some in feed. I think the worm powder did much good.

In 1899 I was fitting a couple of yearling ewes for show. In July one of them became affected with the twisted stomach worm. I gave her one dose of gasoline a day for two weeks. She was getting better when one night she fell into a ditch on her back and died. When I

found her she was still warm. I held a post-mortem examination and to my great surprise, I found, after giving her so much gasoline the twisted stomach worms in great masses; they were about an inch to an inch and a half long. I made a little dish of part of her stomach, put some of these worms in it and poured turpentine on them. It seemed to have little effect on them. I made another dish of the same stomach and put some worms in it and poured gasoline on them. The gasoline turned them a little white and it seemed to make them sick. I then made another dish and put a few worms in it and poured crude carbolic acid on them; it killed them instantly.

The ewe's lungs and first stomach were as healthy, seemingly, as any sheep I had ever butchered. My judgment is that any medicine strong enough to kill the worms instantly will kill the sheep also.

In 1900 I began using the worm powder in May keeping it before my sheep all the time in salt. However, during the month of August I saw signs of disease and I went to work at once. I found eight lambs in a very bad shape. I took them to my barn and began to treat them by giving two doses a day for six days, then one dose a day for two weeks. The lambs were so weak they could not stand on their feet over five or ten minutes at one time and were humped in their backs. All these lambs got well and are looking fine to-day. You could not tell they had ever been sick. I had a two year old ewe that was almost a hopeless case. I thought I would experiment on her. I would either kill or cure her. I dosed her on gasoline three times a day for about a week, then twice a day for two weeks or more. She got well although I turned her out to die. I feel safe in saying that I gave her two or three quarts of gasoline.

As to grub in the head, I believe a sheep in good health can dislodge them and that diseased sheep most always have grub in the head.

My opinion is that sheep affected with lung worms rarely ever become healthy afterwards. This is all I know. If it is worth anything to you sheep men I am glad of it. I hope that you may be benefited.

BREEDERS' EXPERIENCE.

By Hopson Glascock, Rensselear, Mo.

From my youth up to my majority, I, like a great number of characters in the Bible, looked after my father's sheep; a work in which I took great interest. In lambing time it was my duty to go early each morning out among the flock to see if there were any lambs that were too weak to stand. If there were any such I would take them to the house, give them a warm bath and feed them until they were strong enough to be returned to their mother.

I, like my father, have adopted a plan to protect my sheep against injury from dogs, which I find to be very effectual and that is to keep a bell on one to every ten head where your flock is small and one to every twenty where it is larger.

I think if all the breeders would adopt this plan they would be pleased with the results. The rattling of many bells will attract the attention and who would be so busy as not to drive a dog off of a sheep?

Soon after I was married, I started with a small flock of sheep and succeeded well with them for about three years. Then from some cause they took the scab. I had had some experience along this line when a boy with my father. My father's sheep had had the scab and we had a hard time to get rid of it. The remedy we used then was an ointment of sulphur and lard in about equal parts. I held the sheep while he applied the remedy to the affected parts with a common tooth brush. Rather than undertake to cure my sheep of the scab at this time, I decided to sell out clean for a season.

In about two years after this my father-in-law gave us ten head of Cotswold grade ewes. I secured a good Cotswold ram and have been breeding in that line ever since, with the exception of a few years back, I undertook to keep and breed two distinct breeds on the same farm, a business I became thoroughly disgusted with and met with little or no satisfaction.

The sheep industry, like the horse and swine industry and a great many other things have had their ups and downs. When sheep are in good health and mutton and wool are a good price, the shepherd is in

high glee, for you know they produce two harvests in one year.

In the spring of the year when we have scarcely anything else to sell, it is a very nice thing to have a few hundred pounds of wool to sell at from sixteen to twenty-five cents per pound and with the lambs in the fall you have received almost cash enough to pay for your entire flock.

On the other hand, if your sheep get diseased or the market is away down, some of us become so disgusted and despondent that we wish we had never seen a sheep.

In 1890 or 1891 I lost almost my entire crop of lambs with a disease, which I believe, is commonly called stomach or tape worm. I think about this time there was a great deal of this disease in the whole country. This I consider to be the worst disease that I have had in my flock. In 1893 I had a very fine imported Cotswold ram lamb that seemed to lose his health, run down in condition, lost all the wool off his back and finally died the following summer.

Now I would like to know what his disease was. I have also lost several lambs with something like lung trouble. They would become very much reduced in flesh, cough quite a good deal and in about two or three weeks die. One case I will make special mention of, I dissected this one and found he had a few grubs in his head and some kind of lung trouble, there being a large ulcer on one of his lungs full of yellow corruption. Now I took this lung to our family physician and he said if it was from a human being he would call it consumption.

Notwithstanding these losses and drawbacks I am well pleased with the sheep industry. I would recommend almost every farmer to at least keep a few head of good sheep for I think he will be bountifully paid for the little trouble and expense that he may be at.

I will just give some of my experience in getting ewes to adopt other lambs, and sometimes even claim their own. I have in nearly every instance succeeded in my undertaking. The following is my plan. I put them (the lamb and the ewe) together until she will claim the lamb. It usually takes from three to ten days according to the disposition of the ewe. I find it a good plan to have my dog come around occasionally, this seems to arouse her motherly affection and she will stamp her foot at the dog and smell of the lamb and own it much sooner. It is however, a greater trouble to get a ewe to own a second if she already owns one. Then I take the one she does own, put it in a box so she can

not see it, and leave the other with her, letting both suck at the same time, say every three or four hours.

The old officers were re-elected, N. J. Colman, president; L. E. Shattuck, secretary.

Adjourned.

"There is certainly a good opening for the development of the sheep and Angora goat industry in this State just at the present time. The cheap uncultivated land in the southern part of Missouri furnishes an ideal home for the sheep and Angora. On June 1, 1900, there were 667,735 sheep in the State valued for taxes at $1,041,703, cash value about $2,250,000. Average weight of fleece 6 pounds or a total of 4,006,410 pounds of wool produced.

Whole number of sheep in the United States, 1900, is 41,885,065, valued at $122,665,913.

Total amount of wool produced in the United States for the year of

1840 was 35,802,114 pounds.

1870 was 162,000,000 pounds.

1880 was 232,000,000 pounds.

1890 was 276,000,000 pounds.

1895 was 309,748,000 pounds.

1900 was 288,636,000 pounds.

The natural environments of the sheep are equal, in Missouri, to any other State."

ROAD IMPROVEMENT ASSOCIATION.

Reported by MISS SNOWDON WILLIS.

Fayette, Mo., Friday, December 14th., 1:30 P. M.

House called to order by President Stanley.

REPORT OF SECRETARY.

To the President and Members of the Missouri Road Improvement Association.

This is the fourth time your secretary has submitted an annual report.

The first was in 1897 at Lexington and embodied a compiled statement of answers to extensive inquiry as to what special objections were lodged against the road system then in operation in the State. The information received and suggestions thus gathered and made, and a careful, thoughtful study of the subject by a large delegation of earnest, brainy men from every quarter of the State, resulted in the adoption of certain basic principles upon which to build a practical road system.

The Lexington convention was by far the most important and fruitful single road convention ever held in the State. It was the inception of a radical change of our road system; its effects are far reaching and the end is not yet.

The work of the secretary for the next year was mainly devoted to the preparation of a road bill through the advice and counsel of a great number of the most thoughtful and progressive men of this and other States.

This road bill and a discussion of its features constituted the second annual report, which was made at the Mexico convention in 1898. The winter of 1899 was the crucial period. Our road bill was submitted to the Fortieth General Assembly. It was modified and mutilated, torn

down and rebuilded again; and finally brought forth a legislative product, deformed, it is true, yet embracing many of the most vital and important principles of the original bill, but not all.

Our third annual report was made a year ago at Sedalia. The burden of our effort then was to try to suggest the most practical methods of administering the new law, which was to go into effect in 1900.

It was with some fear and apprehension and with real chagrin that we heard the mutterings of disapproval of the new and untried law. We stood aghast in the spring of 1900 when these mutterings of disapproval had ripened into mutiny and open rebellion against the efforts of the County Courts to try to carry out the provisions of the law. Singularly enough, the most serious and universal objection to the law was urged against a matter of minor detail, which did not in any material sense affect the general system. It was the failure to provide compensation for the Road Commissioners. In many counties the commissioners appointed refused to serve, so that in very few districts has the law been in actual operation more than three or four months. But where the system has been tried and the law enforced under even half-way favorable conditions it has proven far more satisfactory than was anticipated. I verily believe that with such amendments to the law as will be made and with the application of the additional tax levy authorized by the constitutional amendment adopted, we will have a road system built upon business principles; one that will insure the very best expenditure of the funds upon the roads. We have to-day the most hopeful indications of substantial progress. The people gave evidence of their faith in the system by voting their approval of the constitutional amendment, a thing they refused to do under the old system.

The rural press, which is at once an index of sentiment and a molder of public opinion, is giving forth utterances in favor of progressive action under the law as against revolutionary action for repeal. The press is especially against a return to the old system, which was so out of harmony with progressive business principles. Any road system is necessarily complex, and must embrace several component elements which are in some sense distinctive. But these component elements, be they ever so distinctive in their scope and purpose, must be so arranged in the system as to harmonize and also conform to business principles. The introduction into the system of any element that is

inharmonious or can not be made to correlate, destroys the efficiency of it. Applying these axiomatic truths to our road system, let us note some of its component parts. First: Ways and means, or tax levy. Second: Collection of revenues. Third: Supervision of disbursement. Fourth: Road construction and repair. These subdivisions or departments of the system are assigned to their several functionaries. By statutory provisions the County Courts in counties not under township organization are authorized to make the levy of taxes for revenue. County and township collectors collect the funds, which are placed to the credit of the several districts. To the Boards of Road Commissioners is assigned the duty of applying the funds and of determining when, where and how they shall be disbursed. This is the central and perhaps the most important feature of the system. A careful, thoughtful and prudent board will devise the best manner of using the funds of the district. It is clothed with ample authority: "The said board shall have sole, exclusive and entire control and jurisdiction over all public highways within their district * * * to construct, improve and repair such highways * * * and for that purpose may employ hands * * * hire teams * * * and all things needful to carry on road work." Provided, also, any part or all road work may be done by contract. It is claimed and with some show of reason, that the Board of Commissioners, at least one of them, should be a competent civil engineer and practical road builder. This might be well, but at present it is not practical to secure such experts for commissioners nor, indeed, do we deem it at all necessary. The board has the authority to employ such experts if thought best.

The larger percentage of work on the roads involves no intricate problems, none that an intelligent foreman employed by the board could not work out. One good civil engineer, who has also studied road building, for each county in most cases would be enough to draw plans and give instructions for all the districts.

As a rule it will be vastly better to have a board composed of practical men of good executive ability, even though they know nothing of civil engineering or the science of road building, than of engineering experts or scientific road builders, whose experiences are not such as to give them a general understanding of the wants of the district. Just as a farmer, who contemplates building barns on his farm would be a

better judge of what the farm needed in that respect than a skilled architect. The expert builder is not always the best adviser.

Much has been said about contract work on the roads. There are two classes of such work. One, which is based on plans and specifications properly drawn, as for illustration, a cut of certain dimensions or a fill of so many cubic yards or gravel by the yard. Such work can be specified before and measured accurately after completion. But in the general repair of the roads the work can not be measured by the yard. So the only practical method of contract in such cases would be for specified work by the day or month, for men, teams or implements. The contract in such cases should require the work to be done at such time and manner as outlined by the commissioners, who should still hold their "entire, sole and exclusive control" over the work.

But the contract method, which is one of the vital and redeeming features of the new law can not be put into efficient practice when labor-paid poll tax is the source of revenue. The poll tax in labor and the contract system can not possibly be made to correlate. They are antithetical, repellant and out of harmony and sympathy as much so as the devil and holy water.

The present road law is generally conceded to be an improvement over the old one, but in my judgment should be amended in several particulars. Several features in the original bill drawn by this association have been omitted or changed. I feel sure from diligent inquiry that the following amendments would meet the approval of the best judges: First: The commissioners should be paid a reasonable compensation. Second: The poll tax should be cash or if any counties desire to cling to the old poll-tax system, let them elect so to do by majority vote. Third: The commissioners should be elected by the voters of each district. Fourth: An annual road meeting should be authorized.

The constitutional amendment adopted at the last election gives County Courts and township boards the right in their discretion to levy any additional amount not to exceed 15 cents on the $100 for road and bridge purposes. This will be levied upon all the property of the county, unless adverse legislation is had, which shall exempt incorporated cities, towns and villages as is now the case, as to tax levies for road purposes, for the law excludes cities, towns and villages from

road districts and exempts them from taxation for roads. But they should by no means escape taxation for road purposes under the new amendment.

One exceedingly important feature of road management is to secure as far as possible from year to year some permanent improvement. It takes a large percentage of our work funds for simply repairing them. In most districts these repairs from year to year have been only temporary; the necessity for other repairs of like character recurring from year to year, so that the roads are not more than maintained, the revenue is spent and we see no better roads than we had the year before. Hence there has arisen a widespread complaint that the funds are wasted, some going so far as to assert that all the revenues applied to the roads for repair are absolutely squandered. But this is an extreme view. A portion of the funds must be used for repair and maintenance, but some amount should be applied every year beyond this for permanent work. Just as in feeding stock, it is a well-known principle that the first requirement is to furnish our animals the daily maintenance ration, the amount fed to them above that goes to permanent growth. Just so the commissioners will of necessity be compelled to use some of the funds for repair, but it is important that enough funds be provided over and above that to insure some permanent improvement.

I verily believe that we are on the threshold of a new era in road management in Missouri and when our system is well established and well understood and judiciously administered the rural districts may call upon the large cities of the State to aid them. Hitherto we have not advocated State aid in road building, but the time comes on when, having perfected our local road system, we may with justice call upon the State for aid.

This would mean that at a given rate of tax levy the city of St. Louis alone would contribute more than all the agricultural interests in the State combined. It would mean that all the cities, towns and villages of the State, together with insurance companies, telephones and other corporate properties, in short, all properties aside from agriculture, would pay nearly three times as much as the farmers. A tax levy of 5 cents on the $100 on the entire properties of the State would yield a greater sum for the roads than a levy of 15 cents on farm properties alone. Certainly no farmer could oppose this, as it would be like laying

down 5 cents and picking up 15 cents. But in all fairness and honesty, we should not ask this till we could give assurance of our competency to so apply the funds that the very best results would follow.

Another hopeful sign of the times is the demand for expert and accurate information on the science and art of road building. Accordingly, there is added to the short-winter course at the College of Agriculture at Columbia a "Special Winter Course in Highway and Bridge Engineering," designed for those who without an advanced technical training are interested in the construction and maintenance of country roads and bridges. I verily believe that there are forces now at work which shall ultimate in bringing our grand State forward, fully equipped for progressive road improvement, as she is notably in our public school system.

Thanking the association for their uniform courtesy and acknowledging the most cordial co-operative aid from the State Board of Agriculture and their tried, true and faithful secretary, I have the honor to be your most obedient servant.

G. W. WATERS, Secretary.

Col. Waters—I will state, however, that this association has been in existence several years, and while it may not appear on the face of it that we have accomplished very much, still I believe that the association has accomplished some things. We have tried some things that have been a failure. We have tried other things that we think are quite a success. This is the first association that has ever succeeded in revolutionizing the road system of our State. Whether or not in this revolution we are going to have a very much better system, remains to be seen.

Mr. Stanley—The Secretary brought out one point that strikes me and that is the reserve fund or fund for permanent improvement. In speaking of the constitutional amendment recently adopted by the State providing for additional levy, we want to bring out this point, would it not be well to incorporate in that bill—I believe it is necessary to have some additonal legislation—that there shall be—not that there may be, but *shall* be—a certain portion of that money set apart to make

permanent improvements, such as highways, bridges, or graveling certain portions of the road? I ask that question and would like the sense of this body in regard to that, whether it would be well to incorporate into the law a clause compelling those parties to set apart a portion of that money for permanent improvement.

Mr. Waters—I would suggest that a Committee on Resolutions ought to be appointed to take some of those things under consideration, and I move that you appoint a Committee on Resolutions consisting of three.

Motion carried.

Mr. ————I would like to suggest an idea, though not a member of this association. In my early days I lived in a county in Kentucky, that made all of their roads turn pikes, and they did it with a fund not very much greater than the tax levy that this amendment brings into the road fund, and instead of using this fund on the roads from year to year and repairing the roads, I think it would be a good idea to make it optional with the counties to set aside this fund as a fund to be devoted to the building of permanent roads entirely and let the county appropriate from this fund from time to time as such roads are completed; say, for instance, whenever a half mile or a mile of road is completed, let the county agree to pay so much out of this fund. In the county that I moved to in Kentucky, they voted a tax of twenty-five cents on the hundred dollars to run ten years, and whenever a mile of road was macadamized according to the specification drawn up by the road commissioner of that county, the county agreed to pay one thousand dollars out of this turn pike fund, and about two months ago I was in that county and there was not a mile of dirt road in the county. Every road in the county has been turn-piked with that fund, and I believe if it was left optional with the counties whether this fifteen cents of additional tax shall go into a fund and then be paid out as the county court may direct, so much per mile for every mile of macadamized road in the county, the people would soon be interested in this subject, and in order to help build this macadamized road, you will find the farmers along the proposed road giving material contributions to assist in building it and I believe this is the only way we will ever have permanent roads. We have in this county been repairing year after year and spending from four to seven thousand dollars per year and our roads

are in no better condition than ten years ago, and it is the same all over the State. I was in Monroe last week and they are making such an effort and have already eight or ten miles of macadamized road that was built by the efforts of the town of Paris and the contributions of her citizens. If this fifteen cents, by which we would raise in this county in the neighborhood of eighteen or twenty thousand dollars a year, was placed in a fund, in a few years we would have a fund the county court could draw on and we could macadamize several miles of road every year. I would like for these gentlemen who are interested and experts and have thought upon this subject of roads to think about it, and if possible, give some of the counties in this State a right to use this fifteen cents additional levy.

Mr. Stanley—That is exactly the experience we had in the county where I was raised. I was back there a few years ago, and I do not think there is a dirt road in the county; all are macadamized in the manner the gentleman speaks of. In other words, they paid a certain portion of the cost whenever they got a mile of road. They would not accept anything but a three mile pike. Whenever a road was completed they had three thousand dollars at their command.

THE ROAD LAW IN OPERATION.

By Hon. W. B. McRoberts, Monticello, Mo.

I am on this program partly at the suggestion of the State Board of Agriculture and partly because I am interested myself. I have taken considerable interest in this matter.

I want to speak a few words leading up to the present road law and the efforts made along that line. Not only in our county was it discussed, but in other counties. There were two road associations in the State of Missouri, one the Road Association in St. Louis, and this one which holds its meetings under the auspices of the State Board of Agriculture. I was present at the meeting of this association held at Lexington in December, 1897, to learn what I could in regard to these matters, and there the law, later enacted, was formulated. After it was

formulated, it was discussed at the institutes held by the State Board of Agriculture, in a number of counties in the State, perhaps some forty or fifty, not for the purpose of impressing the people with the ideas contained in it, but to bring out discussions and get objections in order that they might over-come them and formulate a law as nearly as possible satisfactory to the people of the State. At the Mexico meeting in 1898, this bill was decided upon and the State Board of Agriculture put the bill into my hands; turned it over to me to introduce into the Legislature. I did so and we passed the measure as soon as we could; not as it left the hands of this road association—hardly in as good shape—but we must remember and realize the fact that in the Legislature there are one hundred and forty members and all have interests they wish to carry through. But my subject is the law in operation. As soon as the law was passed and I returned home, objections began to come in. They never said a word about the good features, but only spoke of the objectionable ones.

I then went to the meeting at Sedalia after the law had been passed in the spring of 1899. Now then, as I have said, this law had been discussed from one end of the State to the other, and we had worked upon it and tried to eliminate objectionable features; but unfortunately we found a sentiment rather against it.

Now, to give you some idea of the impressions that were out, when I got home I was up in the northern part of the county and I met there an ex-member from an adjoining county, Knox I believe, with whom I had served in former Legislatures. He said: "How did you get along last winter?" I told him "fine." He said: "You fellows must have all been drunk when you passed that road law." I said: "We served there together, you know about how that is, and I don't know that it was any worse than when you were there." He said: "You introduced that law and the other fellows voted for it." I said: "Yes, and I suppose I got the larger share of the 'cussing.'" I asked him if he liked it and he said "no." I said: "What are your objections? We have passed that law and now there is but one way to get it right; find the objections and state what they are." He said: "You don't pay the commissioners anything, I think that is wrong." I said: "Number one, now go on." He said: "Well, I don't know but what the law would be about right if they were paid for their time." Now the law

was passed in the latter part of the session of 1898 and 1899, but did not become operative until the season of 1900 and these objections were made before the law had been tested at all.

I am talking to you about the application of this law. Well, the county courts in the State did the best they could. As far as my experience goes, I can not go much beyond my own county and one or two adjoining counties, but I can tell you what took place there and think it is a fair sample of what took place in every county in the State. In my own county the commissioners were appointed. Some would serve and some few would not. It was the same way in Clark county. I live in the northern part of my county and am in Clark county frequently. In our county the objection, of course, had to be met of not paying the commissioners and their objections were a good deal imaginary. They expected that there would be a great burden on their hands. They found the work nothing like as arduous as they expected.

In Lewis county, and it was the same way in Howard, we appropriated for road purposes ten cents on the hundred dollars. A number of other counties did the same. But in some counties it takes all the revenue to pay the actual running expenses of the county and have only the poll tax to apply to the road. But we appropriated this ten cents on the hundred dollars and when our county clerk made out the assessment of each district, each commissioner knew exactly how much money he had to expend in his district. They did not all follow the same course, but they made the best contracts they could make. In November I met with different ones and out of fifteen districts there was but one district that went beyond the ten cents on the hundred dollar valuation in his district. They knew how much they had and stayed within that limit. In Lewis and Clark counties anyone will admit they have done more work on roads within the last year than ever before. The new system has saved Lewis county two thousand dollars or more. Under the old system the overseers were paid out of the bridge fund in our county. They paid the overseers two thousand dollars or more. Col. Waters and myself made the amount up to twenty-five hundred, but our judges said to be safe, better make it two thousand dollars. This overseer fund was saved to the county and in our county the insane asylum fund was largely behind and it paid more than half the deficit. We have found this to be the case in our county that the new system has

been a large saving and, as I have said before, the commissioners found the work that they had to do was largely imaginary. I remember one gentleman when he was first appointed refused to serve, but the court insisted that he serve and when we met in November he said: "My work did not lose me any time, I did not miss the time it took." Another said: "I was opposed to that law all along, but I find in my district we have done probably the work of two years in one. Now I think it is a good law and I am in favor of it." In Clark county it was a good deal the same way.

Would say in regard to the speech made by the gentleman about building permanent roads, I am in favor of that and think it is all right. But there is one thing this association set out to do and we can only do one thing at a time. We want to establish this system and get the best labor possible out of what funds we have for road purposes. We are obliged to keep our public highways in good repair. When it freezes and thaws and rains they will get muddy but we can keep them in good condition when the weather is favorable. I was born in Kentucky and I know the building of roads there is very different from what it is here in Missouri. You can build a rock road a hundred miles in Kentucky in any direction and not haul the stone or gravel for more than half a mile, while in Missouri you would often have to haul it five or ten miles and thereby incur great expense. There is very little stone in our prairie counties and where you have to haul the stone a great distance the expense accumulates rapidly. I am as much in favor of good roads as anyone and hope the time may soon come when provision can be made for building more permanent roads.

As to the new system, I think it is all right. Perhaps there may be some danger of the next Legislature going to an extreme. As I said in the beginning, the greatest objection to this law was imaginary on account of commissioners not being paid and in many counties would not serve. I was a commissioner in the district in which I was located. I served and two splendid gentlemen served with me. They were active business fellows, full of business. They did not want to spare much time and I took the work off of them and did it nearly all myself and did not lose much time. I believe the original bill as we presented it to the Legislature was the correct one. It provided that each commissioner should receive not to exceed fifteen dollars. This law provides that these

men shall meet for the purpose of organizing and taking into consideration what work they shall do, and that they shall meet another day for the purpose of receiving bids from parties wanting to work the roads. That gives every man in the township who desires to take part in the work, a chance to do so, and no one can complain that he has not had a chance. If men go to town and put in a day and pay for their dinners, they should receive some pay. We did not want at any time to put that amount high enough so that there would be a contest for the money in it. We aimed to avoid that, and I think to-day, if the men were paid what we gave them in the original bill, if we could make that change in the law, and stop there, the other would adjust itself. One reason why these commissioners were not paid is this, in 1895 the Legislature passed a special road district law. This special road district was a territory not exceeding six miles square wherein was located saloons in a town or city of the third or fourth class and the fund set apart for the improvement of the roads in the special road district was obtained partly from one-fourth of the dramshop license. They do not pay their commissioners, but they get the best men and seem to have no trouble in getting them.

Illinois has almost the same law and so has Iowa, paying their commissioners a small amount, and I think it right that they should.

In speaking of the work in my district, and it is the same in all other districts, I believe it wise to keep the system in force for four or five years, to give it time for a fair trial. They may not like it the first year, but after the third or fourth year they get familiar with the law and realize the benefits.

Again, the county courts make mistakes. They could not help it. I don't care how particular they are, they will get men not qualified for their positions. They have to drop those men out and keep the good men that they get; the first year being the hardest to overcome for the judges are required to appoint three commissioners for each district. These are appointed for one, two and three years so the term of one commissioner expires each year and the court then after the first year has only one to appoint for each district.

I live in the east part of this State, near the State of Illinois. I am frequently in that State, making perhaps two or three trips there during the year. About two months ago I visited several towns in that State. I was with a nice gentleman and we traveled some fifty or sixty miles

in buggies. As we came back we crossed the river, and he said: "Well, there is one thing we must admit, Illinois beats us bad in her roads." That is true and any man must admit it. Missouri is deficient along that line and there is no mistake about it. But if you will give us a levy of fifteen cents on the hundred dollars we will never ask any more, for keeping up our dirt roads. We can grade our roads up and keep them in good condition for that amount. Of course when it is rainy or thawing and freezing our roads will get muddy, but it will be sufficient to keep them in good repair, and that is the intention of the law, and I believe that the plan of the present law is all right.

The difference between the new system and the old is that the new system puts the supervision of the roads in the hands of those who are located right in the district where the road funds are to be expended.

Under this law there is no doubt in the world but what we will get much better results for the expense. Take Illinois and Iowa, they run that plan exactly, and as I have said, I live near the Illinois line and their roads are in much better condition than ours. They have roads that would get just as muddy, but they keep them in good repair and in good shape and when the weather is favorable and the road dry they are splendid. In Missouri many of our roads are dangerous and unsafe and that fifteen cent levy on the hundred dollar valuation accruing from the constitutional amendment just passed, will put them in good condition. Of course in counties like Lewis and all other counties that now apply or can apply ten cents on the hundred dollar valuation out of the levy for county purposes and then add to that the amount paid to overseers under the old law, which will amount fully to five cents on the hundred dollar valuation, that makes the fifteen cents without acquiring any additional, as provided by the last constitutional amendment. But in those counties where it required all of the revenue allowed by law for county purposes to pay the actual legitimate expenses of the county, without having anything but poll tax to keep up their public highways, these counties can now avail themselves of the opportunity provided by the last amendment, and their judges can levy five, ten or fifteen cents as they may advise.

I believe I have about gone over the ground and given you so far as I can the effects of the law and the work under that law, and I say in my county and Clark county and in every other county where commissioners have served, they will make the same report.

OUR NEW ROAD LAW AND NECESSARY AMENDMENTS.

By W. L. Addy, Parnell City, Mo.

This is a subject embodying so much of a suggestive character that I almost shrink from the responsibility embodied in an effort to meet the requirements. The law is one which has undergone severe and unjust criticism. As adopted by the General Assembly it does not have the unqualified support of its authors and friends. But was the best possible form available at the time of its consideration.

Possibly had the bill been passed as originally offered the law would have been more nearly perfect and would have been more generally indorsed.

Doubtless at this time, the unanimous conclusion is, the law as exemplified is a step in the right direction and with careful revision will result in a better condition of our roads throughout the State. With reference to the operation upon the roads under the new road law, I find where parties have given it a fair trial, it has proven to be an improvement over the law repealed.

But too often, indeed, have the Commissioners which were appointed by the county courts under this law, failed to organize because of the disfavor of the law. The result has been the district over which they should have had jurisdiction has lost its poll tax for a year and the roads in such district have been seriously neglected.

Commissioners who qualified and organized and went forth to give the law a fair trial or desired to do for the roads all that was practicable under the law, have demonstrated that although the means at hand were limited, they were able to place everything on a strictly cash basis and secure more actual work at a vastly less expense than has been customary under old conditions. It has been wisely said, "To have good roads the people must first want good roads." So with reference to this law, if the people desire to make the best of conditions, they have succeeded in demonstrating the favorable characteristics embodied within the law referred to and have also relieved the county courts of much annoyance and a constant drain upon the general funds with improvement in general results.

The law permits losses which should be avoided. To more fully explain this point; instances have come to my notice in which when poll tax was due and the officer desired to press collection, the party from whom such poll tax should have been collected had removed from the district and collection was beyond question. Other instances where individuals contemplate a move, have refused to work when given an opportunity and by the move have placed themselves beyond a possiblity of a cash collection. This should be placed upon a more stringent basis and admit of a more prompt collection of the poll tax.

Doubtless, as was originally intended by the authors of the bill to have all poll tax paid in the hands of the county treasurer for the benefit of the district from which it came, is a theory based upon sound and economic principles.

In sections where the character of the country is broken and heavy rains result in unexpected damages to the roads it would seem that the contract system as contemplated would not be entirely practicable.

That often contractors would have drains upon the funds to a sufficient extent to embarrass the system in case of the often serious results of our general washouts. The point as covered by this suggestion under the old law was seriously hampered by the lack for cash funds and more seriously burdened by poll tax workers whose practice too often has been to do poll tax work when no other duty claimed their attention.

To overcome these objections I suggest that the new system be placed upon a strictly cash basis and in the hands of a commissioner as per the present law. That all poll tax be in cash or work upon a cash basis subject to the option of the commissioner and due to them upon a stated limit of time from date of opening of the working season of the respective year.

With reference to compensation of the commissioner, the responsibility is worthy a reward. To what extent commissioners vary in their expressions with reference to past experience. The more successful, report the responsibilities, the greater burden of the system and are not seriously condemning the law upon this point.

By the system suggested the operation would be entirely in the management of the commissioner upon a strictly cash basis, under which system I see no reason for the roads in the respective districts not being

as well improved as conditions will permit and the enterprise of the commissioner may show. By an annual report to the county court at the close of each year the public funds would be doubly guarded and the condition of respective district funds open for general inspection.

Mr. Stanley—The next thing on the program is "Poll Tax Under the New Law," by Alex. Maitland. He has gone home and left his paper with the secretary.

Col. Waters—I will say as an apology for Mr. Maitland, he expected to be here and give a talk, and wrote his paper up to-day very hastily.

POLL TAX UNDER THE PRESENT ROAD LAW.

By ALEXANDER MAITLAND, Richmond, Mo.

Mr. President and Gentlemen of the Road Convention:

The subject assigned me, "Poll Tax Under the Present Road Law," means, I suppose, the best way to utilize the tax under the present condition of cash or labor. Right here I would remark, it seems to have been a great mistake making the payment optional. At first glance the law seems to be somewhat contradictory as the 13th section uses the following language: "Both poll and property tax shall be collected as other state or county taxes and the amounts of money so collected, etc." While in section 18 it says: "Any taxpayer may pay to the board the amount of poll tax due for the current year in money or labor, and if in labor it shall be performed when required by the commissioners or their representatives prior to October 1st." But on closer observation we discover that a poll tax payer may settle with the commissioners in labor if he does not wish to pay the money to the collector. This feature, as I have understood was insisted upon by members from southern and southwestern parts of the State, before they would give the law their support.

There seems to be no question where the tax has been paid in money the work has been much more satisfactory to all parties concerned. As Illinois has about the same road law as ours we might probably derive some benefit from their exprience. In talking to an Illinoisian last spring as to how they succeeded with the tax paid in

labor, he mentioned the manner of handling it with them. In the early part of the season the superintendent makes a list of those who wish to pay in labor and the various months in which they wish to labor, notifying them at the time. If they fail to respond they will have to settle with the collector. Another way in which it might be done, is if the law could be made of local option so that counties preferring to have the poll paid in cash alone could adopt that plan and where the other suited best it might be adopted.

Reports from the road convention that lately met in Chicago says it recommended the abolition of the poll tax entirely but I hardly think we have advanced far enough yet and must continue poll tax for sometime yet. What we want to discover is the best way to use it.

Adjourned to meet 7:30 p. m.

EVENING SESSION—7:30 P. M.

Mr. Stanley—Mr. Bothwell was unavoidably detained at home and if it is the pleasure of the convention the secretary will read Mr. Bothwell's paper.

THE IMPROVEMENT OF ROADS.

By J. H. Bothwell, Sedalia, Mo.

The above subject is that assigned to me as the theme for such remarks as I am expected to make before this meeting in connection with the State Industrial Associations. The subject is so important, and presents so many interesting features, that it is difficult to treat it appropriately in so short a time as I can give to it.

The need and absolute necessity for carrying on the work of road improvement is universally conceded. All intelligent people in Missouri admit the absolute necessity of carrying on in a systematic manner the improvement of our roads and highways. At the beginning, and as the basis of this work, it is necessary to arouse public interest, and to have the people understand the importance of it. Without a proper public sentiment there can be no satisfactory progress made in the im-

provement of our roads. It is only in communities where the people are earnestly demanding better roads that it will be possible to make substantial progress towards getting better roads. As in all great works that affect public interests, the most important part of the work is to get the public aroused and sufficiently interested in the work to make success possible.

After the people of a county or community are sufficiently aroused as to the importance and need of improvement in our roads, there then comes the question of the manner of taking up the work, and of the ways and means with which to prosecute such work. One great difficulty in carrying on the work of road improvements in Missouri grows out of the fact that certain county officers and other officials are elected by the people, and are then left to do everything for the people that the people want done. Often the general public assumes an attitude of criticism, or even opposition, toward the very men who are charged with the work of doing something that the people want done. In the matter of road improvements one of the first necessities is to have intelligent and honest officials in charge of the public interests. At the same time it is of the highest importance that the people should have other representatives, unofficial committees, who will co-operate with the public officers in carrying on the work. Very often there are found men in the community, of high character and great intelligence, who are not willing to assume public office and give time to all the details of every duty of that office, yet are willing to advise with and assist the public officials in carrying on some particular work in which the public are especially interested. In the erection of court houses, colleges, and other buildings of a public nature, there are often citizens' organizations with officers and committees who co-operate with the public officers, and greatly advance the work and bring about better results than would have been possible if no one interested themselves in the matter, except the officers charged with the duty. It seems to me that it is of great importance to have such organizations in every township or community in which there is to be any serious effort made for the improvement of the public roads.

If each township or community having some hundreds or thousands of population could be represented by a committee of five or ten or fifteen leading citizens who would take an active interest in the work of road improvement ,that committee could very greatly aid the county or

township officers who are the public servants in charge of the work. If the people are not sufficiently interested in the work to be represented by committees who will aid the public officers, then it is not very likely that the public officers alone will be able to do much toward the work in such community. The want of interest on the part of the people, and their failure to co-operate with and support the public officers, will usually prevent any satisfactory progress in the work.

If a community—either a township or a county—appreciates the importance of road improvements, agrees on the necessity of taking up the work, and will properly support the public officers charged with the duty, and will aid them with the advice and help of proper committees—then the next question is as to where and how to begin, and the manner of procuring the ways and means for carrying on the work. Generally it matters but little where a beginning is made. The main and vital thing is to make a beginning. Begin anywhere where the roads are bad. The manner of improving any particular piece of bad road, or of constructing any considerable length of good road, must depend largely on the character of the road, and on the nature of the materials most accessible.

The improvement of the ordinary country dirt road is the work which is most important, because it is about all the work that can usually be done along the vast stretches of country roads in Missouri. When the road is properly laid out and established, about the first thing to be done is to establish a proper grade and provide for the drainage of the road-bed. The proper drainage of each and every portion of the road is one of the greatest and most practical of all the problems connected with the road making. If every road in the State was properly graded and drained, and if every vehicle which carries any considerable load could be forced to use wide tires—from four to six inches in width, according to weight of load—the problem of improving dirt roads would be a very simple one thereafter. The matter of putting in culverts and bridges is a simple one to some extent, and the questions in constructing culverts and bridges are usually less difficult than the question of where the money can be had to pay for the culverts and bridges when constructed.

If all the dirt roads of importance could be properly graded and drained, and satisfactory culverts and bridges put in where needed, the next work would be to take the worst places and put on surfacing or

metaling, or broken rock, gravel, burned clay, paving brick, or whatever can be most readily procured suited to the purpose. In most of the counties of Missouri there can be found in great abundance good limestone which can be broken and put on the roads where needed. In some counties abundant deposits of gravel can be found, which only needs to be loaded and hauled and distributed on the roads and properly rolled. In a few counties it seems necessary to find other materials or to haul stone and gravel from a long distance.

In the counties where limestone is so abundant, it seems to me that the counties might properly invest in the purchase of rock crushers, which could then be furnished by the county to the different townships or communities where the people are willing to give time and money to the improvement of the roads. In almost every community there are public spirited citizens who would be willing to contribute money to be used in paying for labor, in quarrying the rock and in crushing it, while the teams and wagons of other citizens could be donated for the hauling of the rock and distributing it along the public roads at places agreed upon,—the entire work to be in charge of public officers, supported and aided by committees appointed by the citizens. In this manner a great work might be carried on in any community where the people are really in earnest and want better roads. In most of the counties, the county courts have some available funds belonging to the road and bridge fund, and could make use of a part of it in purchasing rock crushers, and in helping to carry on the work if the people would take up the matter earnestly and render the proper aid and support.

By the terms of the second constitutional amendment submitted and ratified at the general election in November, 1900, there is the right and power given to counties to organize townships, to levy and collect a special tax not exceeding fifteen cents on each one hundred dollars valuation, to be used for road and bridge purposes. This is a discretionary power. It is one of vast importance, and its wise and honest execution would mean a great deal to the people of Missouri, because it will afford large means for carrying on the work of road improvements. I have not time to go into details of what might be accomplished under the laws as they now stand, nor am I prepared to advocate specific changes in the road laws as they now stand. Doubtless the road laws, like all laws, might be improved on, but the great problem is to have the best possible work

carried on under the laws and conditions as they are found to exist from time to time. The chief difficulty is in getting the people and the public officers to take a substantial and continuing interest in the matter.

In many sections of our land organizations have been formed in towns and villages and rural districts known as "Village Improvement Societies," and these organizations have been found to be powerful and effective in bringing about the improvement of village streets, parks, gardens and public roads. Often the women of the community are found to be the most faithful and earnest workers in this cause. In some communities in the Eastern States it has been found possible to convert dreary and forbidding districts into beautiful and inviting suburbs, or country ways, through the efforts of Village Improvement Associations carried on intelligently through the course of only a few years. That system if adopted and carried on in the villages and country communities of Missouri, would be a most powerful aid in the work of improving our roads and highways.

The growth, development and prosperity of the American people and country during the past century has been the marvel of the world. That growth has been largely in the development of our material resources, and the application of science and art to all the industries. Incident to this growth and development has been the building up of great cities which are not surpassed by any cities in the world. That has been done at sacrifice of time and money that are incredible in their totals. The money has been raised by taxation to some extent, but very largely by the issue of municipal bonds, which are to be paid in the decades yet to come.

During this time in a few rural communities the same spirit of progress and growth has been manifested, and country homes and country roads are made to give evidences of the good taste and liberality of the people. One of the most pleasing predictions or prophecies that has come to my attention is found in the words of a noted man who predicts that during the next century the most prominent and striking change which will take place in America will be in the development, growth and prosperity of our country communities and districts. He asserts the belief that we are at the beginning of a period in which the great masses of the American people will realize the importance, and take up and successfully prosecute the work of improving all the natural advantages

which we enjoy for having comfortable and beautiful country homes, and that incident thereto will be the planning and building of a complete system of country roads that will make life more comfortable and enjoyable and profitable, and add greatly to the beauty, as well as the practical utility, of country homes and country occupations.

It seems to me that all our people should be taught to think and feel how important it is for each and every citizen in the community to have a share in such works as are necessary to the betterment of the conditions under which we and those of coming generations must live. If the people will come to realize the importance and practical utility of considering these subjects, and of personally taking an interest in the improvement of our roads, then it will be not only possible but practically an easy matter to properly begin and successfully carry on the work of road improvement. Nothing that we can do in this country will add more to the value of our properties, more to the comfort and pleasure of life, than to successfully prosecute the work of practical road improvement. I have small confidence in my ability to aid the practical road workers in their tasks, but I shall hope at all times to raise my voice in urging the importance of the subject, and in appealing to all the people to join in taking up and carrying on the work. If we can all be brought to agree as to the importance of the work, and the necessity of making an immediate beginning, then the practical part of it can be successfully carried on by those who are charged with that duty.

DISCUSSION.

Mr. Stanley—I wish to call attention to one clause in Mr. Bothwell's paper, and that is the assistance of county officers, or by the citizens through the county officers in the work of road improvement. I have had a good deal of experience in that line and know what it is to depend largely upon my own resources, or in other words, upon my own ability to devise ways and means of improvement and depend upon an appropriation to get it done, and in that connection I want to say something in commendation of Mr. Bothwell's suggestion of having a citizens' committee to counsel with the officers. It has been the hardest task I have had to perform in the last eight years as road commissioner to devise means for all the improvements that are wanted. Men have

come to me and said, such and such a thing is needed to be done, can't you do it, and then they go home. They call my attention to something wrong on the road and say, "Stanley, can't you have that fixed." I was willing to accommodate them as long as the money would hold out. I was always willing to do my part.

The worst road passed Mr. Bothwell's summer residence, but I did not have much trouble with that. Mr. Bothwell took it into his head to have that road improved and he called a meeting at his summer residence one Saturday, and he called his neighbors and those living along the public highway, who used the same road that he did, and myself and the members of the county court and other county officials to see him, to come in the morning and stay all day, and in the beautiful grove adjacent to his summer residence he spread an ample lunch which would satisfy the inner man and after dinner he proceeded to business, when everybody was in good humor; and he started a subscription list by saying: "I will give as much as any four of you," and it was only a little while till Mr. Bothwell had two hundred and fifty dollars raised. I do not believe there were as many farmers there as there are here to-night. Their wives and children were there having a nice time. The county court did just exactly what I want done to that fifteen cent rate tax, they added as much as he raised to that fund and in a little while we had a good road and could travel on good road till we got to the prairie. That is the quickest way to get good roads. If you want good roads, help build them. The people who use them ought to give more money and let the other people make up the rest. That is the way we got our roads, as good as they are, not as good as Mr. Bothwell would like them nor as good as I would like them, but better than they were twelve months ago.

Mr. Geo. F. Reed, of Springfield, was to give us a talk on Civil Engineering in Road Building. This is the first meeting of this Road Association or any other that he has missed in four or five years. He is an earnest worker in behalf of good roads and I have received two letters from him in the last few days, one since coming here, and he stated that he was very busy. He is the road commissioner of Greene county and is winding up the business for his successor and has all he can do, and he said if kind Providence had sent him bad weather so that he could not work, he would have been here. He regretted that he could not be here. In his place we have a talk by Hon. D. D. Wallace who will give us some

experience in road building in Ralls county and tell us how they got good roads there.

EXPERIENCE IN ROAD BUILDING IN RALLS COUNTY.

By Hon. David Wallace, New London, Mo.

Mr. Chairman, Ladies and Gentlemen:

I did not know that I was to take the place of the party who is absent, but that does not matter. This is mainly an informal meeting. I want to say right at the start that I enjoyed very much the report of the committee on resolutions and also the paper by Mr. Bothwell. I think there are in that paper some splendid thoughts, suggestions that can be acted upon and carried out into practical solution.

Mr. Stanley's speaking of the little experience they had with the road passing Mr. Bothwell's summer residence reminds me of an experience of that kind we had in Ralls county. It was on the road leading south from New London. The hauling of ties over the road and the wagons had cut deep ruts into it and in bad weather it had become an eye sore. The soil had been washed off to the rivers and into the sea, and it was a bad road, no worse than others, but bad enough. The heavy traffic from Perry had cut it up until we all agreed that something must be done to improve its condition. The county court said they had the whole county to look after and could not give much attention to one road, and that they could not spend all their money on the road leading to New London. We talked up the matter among ourselves and drew up a paper and many of the farmers living along that road gave fifty dollars. We raised twelve hundred dollars. We measured the distance and got the grades and then went before the county court with our petition and subscription of twelve hundred dollars. We said, we want a rock road, a substantial road that will enable us to get more of this traffic from the south. We pressed the county court so that they had to pass it; economical, good men as they were, they could not hold out against us. Finally we got eight hundred dollars and then engaged the services of a practical road builder from Hannibal. We said to him

we want a smooth road to New London, we want it eighteen feet wide and one foot deep of broken rock. We made a contract with him and he agreed to make a little over a half a mile with what money we had. He put rock down in the bottom and graded the road up, gave it a good surface with drains on either side. He put rock in the bottom broken tolerably well and the top ones were not over two and a half or three inches in diameter. That road was a little rocky all summer, but travel made it smooth as a parlor floor and it is now the pride of New London. People take their carriages and instead of driving out on the gravel road toward Salt river, they now drive on this road and have made it a splendid smooth one, a little over half a mile for two thousand dollars. From that date to this it has been a smooth, splendid road. It has had some repair, but not much, all these years. But the spirit of building good roads spread over the county. The farmers saw what a pleasure it was to drive over this smooth road and they went into their own neighborhoods and subscribed money and teams, and those who could not spare their teams hired them; and the spirit has spread into other parts of the county. Our people have found out that they can build good roads when they go to work. This road to New London was built by persistent effort, knocking at the doors of the county court and saying, "we must have a good road." Our county court has responded to the aid of the people and continually allowed money for roads. We have now more than fifteen miles of gravel road in our county and we are building more good and smooth roads every year.

There was something said in Mr. Bothwell's paper about rock crushers. I think that is one of the crying needs of road building in this State. We must have something more permanent than dirt. You can drain and pack dirt roads, but when the rains come they will get muddy and you will soon have a bad road again. Dirt roads will get soft when the rains come on.

If you get the proper pressure to bear on your county courts, they will listen to your appeals. Go after your county courts in earnest because every material interest of your county demands good roads, and you will find them responsive.

I find here a splendid town, fine schools inviting the youth of the land, but I do not see a handful of gravel in the streets. That is not in accord with the progressive spirit of this town. I am not here to criti-

cise and censure, but I can only commend that which is worthy. I do not know whether you are town or country people, but a town like this ought to get into the new road system in earnest. As soon as I got off the train I saw the dirt roads, the wheels had left ruts hard and dry. I speak not in the spirit of criticism, but we ought to go after our county courts. There is not a cent of money taken from the pockets of the people, outside of that spent on the education of our boys and girls, that brings the return of that spent on good roads. Good roads are a pleasure to yourself and your family. We are all human and we need this pleasure.

This is the first good roads convention I ever attended and I am glad I am here. I would like for this spirit of good roads to get abroad in the State, would like for Missouri to begin the new century with a determination to have better roads. We are the fifth State in the Union in so many respects in this great galaxy of States, and yet we take our products to market over dirt roads.

But these gentlemen may frame the best statutes, word them as carefully as they may and yet they will not make good roads. Behind the law there must be public sentiment to push it to a successful result. I am glad to see this spirit manifested. It is new to me because I am attending my first road convention. But there is a spirit abroad in this State for better roads. We have adopted an amendment calling for additional revenue. The people are willing to go down into their pockets. There is a spirit of restlessness in the State that will not stop with our present condition, but wants to get down to the bottom of every enterprise. Talk about this or that interest being profitable, as if any interest could be compared with good roads. Without them every interest will go out like the snuffing of a candle. (Applause.) When you build up good roads, you bring the country people in touch with the cities. If there must be a tightening of the purse strings, don't tighten them on the road question, because good roads bring back a greater amount of recompense than any other expenditure of public money save that expended for the cultivation of the brains of our boys and girls. Along this line I hope to see this splendid State of Missouri with the in-coming century take upon itself new life and vigor. Let the energy of this State take upon itself a new demand and new life in the building of good roads. It may be said this is a selfish interest. Possibly it is

selfish in me to want a good road passing by my house, where my neighbors can pass and repass, but if this is selfish it is not that species of selfishness that hurts my neighbor while it benefits me. A good road is a benefit to every man that passes over it; it even benefits the tramp who walks over it, if it is hard and clean and dry.

In building good roads we enhance the value of property in that community. Why I remember when we built that road from New London, about which I spoke a while ago, if a man had a good house that sheltered him from the winds and rains and sun—a reasonably good house—after the town people began to use that road for a drive on Sunday afternoons and bring their visitors there, that man would begin to think: "Maybe I had better paint my house or improve it in some way," and I will tell you there has been more improvement on that road since the road was built there than on any road leading to New London. It has touched our pride. I did not think my house needed much, but I concluded to make it a little brighter. A neighbor had a good house on a splendid farm, but he decided to build a better one, so he built a two story front with a nice porch. Another neighbor had a one story house, but built a better one. All along that road into New London on both sides, with few exceptions, they built better houses and kept them painted and put out flowers in front. My wife is fond of flowers and when the neighbors spoke of the beauty of her flowers, she sent for new and more varieties. The improvement of that road stimulated the public spirit that dwells in every bosom as a latent power and comes out when it is touched.

My friends, I did not want to take up your time in making a speech, I am glad I am in this road convention, and I want to see this public spirit spread like prairie fire until every county court is building good roads. The town will be better, its traffic will increase because the farmer has easy access to it, the town will find itself growing and the best of feeling will exist between town and country people. The town people will help to build the roads. When a man comes into New London with a paper for subscription to a road, nearly every merchant, no matter how close he is, will give something. As a result we have good roads from the four quarters coming into New London; and the end is not yet.

I thank you, ladies and gentlemen, for your attention. I hope to

see this Road Association grow and this little leven—there are not many here to-night, but it does not take a multitude to start a reform—increase till it spreads over the whole State. A few enthusiastic men can set this State aflame with a spirit of better roads, and who will say you nay? No man will say no when you are building a splendid road and devising a system and encouraging an interest that will bring us better roads.

I sometimes think much credit is due the boys who have wheels. I never owned a wheel in my life. The American Wheelmen Association should be given the credit of spreading the spirit of road building. They wanted good roads over which they could run their "bikes" without puncturing their tires. The boys have started a sentiment that ought to come from the bone and sinew of the state, from the men who shoulder the burdens and have the work to do. The farmers ought to feel an interest in good roads commensurate with its importance. Some question of politics will bring us out and we will gather together and by political harangue shake the blue-arched dome of heaven. Oh! the cunning of some man who wants to go to Congress or be chief magistrate of the State. He will gather together his friends and inflame them with a spirit that will lift him up to personal fame that he may find a smooth road to glory. But when it comes to good roads there seems to be little enthusiasm. But the change is coming and I want to see it. I want to see the county courts stirred up. We must come down upon them like an avalanche and let them know they must respond to the people's demand.

Col. Waters read the following resolutions which were adopted as read:

WHEREAS, The Missouri State Fair established by an act of the Fortieth General Assembly and located at Sedalia is practically without equipment and the management without available means for that purpose, and

WHEREAS, By the terms of the Act establishing said Fair an exhibition must be held during the season of 1901 or the ground and all improvements thereon, valued at some fifty or sixty thousand dollars, will revert to the donor.

Resolved, That it is the sense of the Industrial Associations of Missouri convened in annual session at Fayette, that the Forty-First General Assembly should make ample appropriation for the creditable equipment of said grounds and take such other action as may be necessary to assure an exhibit of the state's products for 1901.

Resolved, That in our opinion the Missouri State Fair should eventually be made the greatest institution of the kind in the Mississippi Valley, that such action is essential to a proper display of the unlimited resources of the state, that it is but a just recognition of our intelligent and progressive live stock breeders, and that as an encouragement to the agricultural interests of the state will prove a profitable investment.

Mr. Stanley—Mr. D. A. Quick of Atchison county was assigned the

subject of "Road Drainage." He is not here and Mr. Carroll of Jefferson City has kindly consented to talk in his place.

ROAD DRAINAGE.

By Hon. M. V. Carroll, Jefferson City, Mo.

Mr. Chairman:—I have no paper prepared on this subject. I know Mr. Quick, who was assigned this subject, personally, and expected to be entertained by his discussion, and am sorry he was not here, and in a moment of good-heartedness I volunteered my services to your chairman and he quickly took me up and I would not then back out; so I will give you an impromptu talk on this subject. I have some ideas on the subject and will endeavor not to repeat what has been said by the other speakers, and the papers presented.

Anyone who will take the trouble to look through the two large volumes comprising the statutes of the State of Missouri, will find in the twenty-six hundred pages of these two books, seventy solid pages of statutory enactment, comprising more than three hundred and fifteen sections, devoted to road legislation. Some of it is probably forty years old; some of it is obsolete; some of it is contradictory; some very complex and so difficult to understand and interpret that the ordinary citizen, not a lawyer, needs a lawyer to keep him from violating some of that law. In some states they have codifying commissions which meet and condense the laws, cut out effete and dead laws and abridge others of superfluousness and make them compact, simple and comprehensive to the people. We have no such commission in this State, but we have a revision of our laws every ten years. Our constitution provides for that, but confers no right to cut out laws unless repealed by some special enactments. Our road legislation has much that we do not need, that is not uniform and is even contradictory.

Section 9582, Missouri Revised Statutes, provides that the county courts may levy a tax of two dollars on every male inhabitant over twenty-one and under sixty years of age. Section 9604 provides that the county court may levy a poll tax of $2.50, etc., and section 9651 pro-

vides for a poll tax of not less than two dollars or to exceed three dollars. There you have three distinct provisions for citizens living in different parts of the State where these laws are applicable, enjoying these distinctions or discriminations. I might be living some place where I would pay a poll tax of not more than fifty cents instead of paying two dollars or two dollars and a half. One gentleman said his county court levies a tax of three dollars. Possibly it could levy as much as it wanted to. These things ought not to be so. We ought to have a brief, plain, comprehensive road law that will come within the comprehension and understanding of every citizen, whether lawyer or farmer. I take it that the power in this association, the ability in this association is equal to the task of making a simple, plain road law that will be up to date, whose provisions will not cover much space and that will not be so cumbersome that we will have to consult a lawyer every time two neighbors get into a dispute, about what it means. I would say also, without wishing to be critical at all, that I have been expecting and still expect this association, having made a scientific study of this matter, to give to the people of this State, plans, specifications and details on how to make a road that, with such modifications as common sense will indicate, will be applicable in all parts of this State for road work, just as you go to your architect for a plan to build your home. I think that this association can very profitably do this. I think it will be wise to do it. Mr. Bothwell briefly touched upon the subject of how to make, work and improve roads; but until somebody devises a general plan we will have as many plans as we have road overseers. You can go to any community, county or township and unless they have special commissioners who have gotten together and discussed the matter, you will find as many different plans as you have different districts and commissioners and scarcely any two of them the same.

Many of the men who have been spending money in making roads have had no technical experience about how to make a road and they have to have that experience, learn it somehow, and I believe this Road Association, being a State organization, is the proper one to impart that instruction. I would be in favor of making it a legalized, incorporated institution, just as the State Board of Agriculture is an incorporated concern, and let it ask and demand State aid to see that this instruction is properly given, and insist that those who build our roads go where they

can have this instruction. Our University is preparing such instruction and in the meantime we have to depend upon these meetings to circulate and disseminate this information.

Mr. Bothwell referred to road drainage in his paper, saying that it was necessary to properly drain our dirt roads, and I will qualify his statement by saying that it is just as necessary for the macadam road to be properly drained; otherwise it will not last nearly so long and require more attention in the way of repairs. In the section of Ohio where I lived they have all rock roads, gravel or limestone rock, mostly gravel. The parties making the road first drain it well before putting the gravel on, the draining being done by tiling. They put the tiling in the center of the road. It is comparatively a level country. In the cities where they put down asphalt sidewalks it is absolutely necessary to have the ground well drained, otherwise no architect will guarantee a good job. The water will get under it and the frost will follow and bulge it up and crack it and it will scale and chip off and it will soon be out of shape. They will insist on perfect drainage before they will guarantee the walk to be lasting and durable. It is just the same in a rock road. It does not make any difference as to the quality of the road, unless it is properly drained after a while you will have to repair it.

It is customary in this country to depend on side ditches. They are not sufficient, for when the earth is full of water, as it is after heavy rains, the side ditches are full of water and they become clogged with weeds and trash; the ground is saturated with water, and if your road bed is graded sixteen or twenty or twenty-four inches above water in the side ditches, there is too much moisture and the mud becomes a barrier and will not let the water go through and it has to evaporate, hence will keep it muddy. The purpose of drainage is to carry off the surface water and make a porous condition whereby the water will go through. You hear men talk about a road that will hold water like a jug, that is the mud will become tough and waxy and impervious to the water and it can not go down through. The tile drainage under the center of the road will carry off the surface water and make it porous so that the water will go down through.

In Ohio we calculate that a four foot tile ditch will draw water thirty or forty feet on each side. The tile ditch will draw water from both extremes, not through the center, because the center will be packed

hard, but on both sides because they will be porous and loose and the water will go through. Of course you maintain your side ditches to carry off any unusual amount of water, because it can not run through the ground fast enough to get to the tile ditch. A level tile ditch will carry water one-third faster than an open ditch. The suction gives it additional momentum. A six inch tile ditch will carry away more water than a nine inch open ditch because the water will force itself toward the tile and your road thus drained will dry much more quickly. After a heavy rain there will be much water left standing, but it will soon disappear. The water will be speedily soaked out of your road bed and carried away in your tile and side ditches and as soon as the water is gone from the surface that road will settle and become dry. Then when it thaws, just as soon as it is thawed deep enough, that tile ditch will absorb the moisture, and it will soon settle and get dry and you will have a good road. A dirt road properly drained and tiled in the center with a properly constructed tile ditch will be passable nearly all the year. The length of time when it is not passable is comparatively short compared with untiled earth roads. In such undrained roads a large porportion of the year, summer, winter and spring, it gets so muddy that it is impassable.

We are commencing to realize what the influence of good roads are on humanity. In Ohio I did not pay much attention to good roads. You have to be without a luxury before you can appreciate it. We had good roads and could not realize what bad roads were. I remember some things they did not mean. The farmers were not rushing away from their farms because their boys and girls were pining for recreation. They could have that at home. In other words, they could visit each other. I know sections of this State where at certain times of the year neighbors join in and put four horses to the wagon to go to the nearest town to get their coffee and sugar and the mail, and its is sometimes dangerous for a man to start through those roads on horseback. The people can not get their mail for a week. I expect some of you have experienced the same condition. There is no such a thing as sociability in a neighborhood when their roads are in an impassable condition and that is the reason why the boys and girls want to get off of the farm, and the farmers want to get where they can have pleasure for themselves and their wives and children. Good roads make it possible

in any season for one neighbor to visit another, or go to market or the postoffice or church with some sort of pleasure and comfort. We will never have that condition in some of our rural districts until their roads are passable and it will not cost us much when the people realize that it can be done. It can not be done all at once. A hungry man will take half a loaf of bread or what he can get. We can not get good roads all at once, but let us start intelligently to make the best we can and make them as rapidly as possible. We can not build them all at once, we do not know how. The chances are we would build something we would not want. But let us make the best dirt roads we can. Let this association suggest a plan that can be applied all over the State and tell the people how to grade a road, and what kind of a road to make and how to proceed about the drainage. Tell them how and let them inculcate some uniform system throughout the State.

If you use tile drainage you will have a nice bed when you are ready for a rock road. It will not be a temporary building that will have to be removed, but it will furnish a dirt foundation that you will need for rock roads. You would not have to send out of the county to get your tiling, you should have tile factories in every county in Missouri and you need them *now*. You have lots of material here. Tiling would make your land more valuable. You are going to need tile drainage to increase the productiveness of your land in Missouri and you will realize some of these days the value of it. It will then be a home industry, utilizing home labor and run by home money to supply home needs and you can have tile here to drain off the surplus water.

DISCUSSION.

Col. Waters—This question of using tiling for roads has been before the people of Missouri. One man made a special tour of Missouri advocating tile drainage. Mr. Tralean advocated it also, but so far as I am advised there is not a mile of such road yet in this State. I do not know why it has not been done.

Let me call your attention to one other thing the gentleman referred to, in reference to the complexity of the road law on our statutes. The law governing the ninety-six or ninety-seven counties that are not under township organization, is all comprised in fourteen pages, and everything

relating to the laws governing the road systems in these counties may be found in these fourteen pages, and no more. The rest are local option laws, some of them, I grant you, obsolete. The special road district law referred to is a local option law. The other thirteen or fourteen counties under township organization are goverened by the laws contained in ten pages and the laws are fairly simple. The laws governing the roads of the State of Missouri in one hundred and ten or one hundred and eleven counties are all harmonious and alike except where local option has been adopted and these special provisions adopted. Three counties, like St. Louis, for instance, in other words counties containing a hundred thousand inhabitants or more are under a different law. That simplifies the idea of complexity that the gentleman has spoken of. I mention this so we may not be frightened. There is not so much law governing our counties. Fourteen pages comprise absolutely all the laws that govern the road methods of the county of Howard. You will not find anything anywhere else applicable to your case at all.

Mr. Stanley—I have been connected with this road association so long I believe I am the oldest regular attendant I see here to-night. I think this is the tenth annual meeting I have attended without missing. In regard to instructions for road building I wish to say that in 1896 or 1895 or further back than that maybe, I can not remember, the State Board of Agriculture gave drawings and plans for road grading, and I think from the year 1892 at Sedalia and also at Chillicothe the year before and each succeeding year since 1892, that the question of road grading was discussed at each and every meeting until three years ago and we had visited every part of the State, and under the auspices of the State Board of Agriculture in 1896, I myself visited some sixty counties in this State and presented drawings showing how roads should be built. I am saying this in defense of the State Board of Agriculture. Since 1896 and that same year Mr. Love of the southeast part of the State and myself presented these instructions (I will call them that) as to road grading, dirt roads exclusively, and I believe in some three or four different meetings of this association, last year at Sedalia and the year before at Mexico, the two years previous to that, one at Jeffereson City and one at Columbia, the subject of rock road building was discussed. I was on the program for a paper on "Rock or Gravel Roads" the year we met at Mexico and I spent a great deal of time and thought

investigating authorities on the cost of building roads and made out a detailed plan which can be found in the proceedings published for that year, and if any of you will look up the records of this association, which can be had by applying to the secretary of the State Board of Agriculture, for these years, you will find the instructions spoken of by the gentleman, I think, in fairly plain terms; in such terms as any person not accustomed to civil engineering will comprehend.

I wish to place in nomination a set of officers for this association and at the same time extend to the association my thanks for the courtesies and honors that have been placed upon me. I think this is the sixth or seventh meeting that I have presided at as president of this association. I am too much of a democrat to believe in long continued office. We ought to pass them around. I am going to place in nomination a better man and one equally interested in road building, a gentleman who has attended these meetings from afar off and who comes from a distant part of the State and who has asked us time and again to come to his part of the State, and I was in hopes if the Industrial Meeting did not see fit to come to Sedalia, that they would go there. We had expected the Indusrial Associations to make their home in Sedalia from now on. It is expected, I believe, after the State Fair is established and quarters fixed for the State Board of Agriculture, that the State Board of Agriculture will make its home in Sedalia and that these industrial associations will meet there, and I want to say in behalf of Sedalia we hope in the coming fall to have a State Fair equal to any in the Mississippi Valley and in the near future to have something better and greater than any other fair anywhere, any other *State Fair,* at least, and when we get it I want you all to come down and bring your wives and children and neighbors.

In reference to the officers of this association I wish to place in nomination for President, Mr. Geo. F. Reed, for Vice-President, Mr. Addy, of Worth county, and for Secretary—I want to keep a good horse at the wheel—Col. Waters. If I meet with a second I would like to hear it.

Mr. McRoberts—Mr. President, I second those nominations. I do not suppose a member of the association desires to change their present presiding officer. There is one thing that can be said in your behalf. I believe you have always been present. That is a good recommenda-

tion, an officer always present at the meetings, and I am satisfied Mr. Reed and the other members will want you to stay in the position you have occupied so long and would like under the circumstances to ask if you know Mr. Reed will serve.

Motion carried to elect Mr. Geo. F. Reed, of Springfield, for President, Mr. W. L. Addy, of Parnell City, for Vice-President and Mr. G. W. Waters, of Canton, for Secretary.

Mr. Stanley—I wish to thank the people of Howard county for the courtesies we have received during the past week.

Adjourned.

"In the past few years there has been a great deal of hard gratuitous work done by the Road Association, to perfect a better system in the State for road building. The Legislature at every session makes radical changes in the system with a view to improving the roads. The time has come when we should face this question intelligently. It takes material and labor to build roads and it takes money to supply either of these, and while one system may get better results for the same expenditure than another, there can be no general improvement in the roads without an interest is taken by the people living along the roads to be improved. A good interest means that money will be raised, with which labor can be employed and material purchased, and competent supervisors provided. Good roads may be looked upon as a luxury for the farmer but if so, it is one that is more expensive to do without than it is to possess, if all the benefits are considered."

The Status of the Dairy Industry in Missouri in 1901.

From Bulletin, No. 1.

We can not record such a condition of dairying in this State at this time as a pardonable State pride would permit, but we have abundant reasons for being encouraged on account of what has been done and for the evidences of a new era in dairy development which is now dawning. It matters not now what has been the cause that has kept us in the background in dairy farming in the past, whether it has been the natural conservative disposition of our people, or whether it has been because of our comparatively cheap lands and a productive soil, making grain farming and beef and pork raising very profitable, or whether it has been because of a lack of the knowledge necessary to the successful carrying on of the business, let us consider conditions as we find them to-day and the progress we may reasonably expect in the near future.

The gathering of trustworthy and reliable data upon any subject in and for a great State like Missouri, and that without the aid of any legal authority, or the financial support necessary, is an undertaking that requires time and energy and is often met with disappointment.

Since taking charge of this office the first of the present year, we have made some effort to find out what the present status of the dairy condition is, and while our reports are at this writing very imperfect, we shall continue with the aid of those interested until a complete and reliable report can be made of this important business in this State.

From the State Auditor's report we learn that there were in Missouri on June 1, 1900, about 2,172,872 cattle, from which we estimate that there are 723,000 cows or more. Making a reasonable estimate for the number that are used for breeding purposes only, we think it a safe

figure to place the number of cows in the State available for dairy purposes at 500,000. A large number of these cows are used for raising calves and for the production of milk and butter for home consumption, and after the calves are weaned the cows are dried off and "roughed" through the winter, thus producing but a very small profit to the owner above the cost of keeping. A considerable number of cows are kept in private milk dairies that furnish milk directly to the consumer in towns and cities. From reports received from forty milk dairies located in different parts of the State and probably representing a fair average condition, we find that the average annual production per cow is 4,100 pounds of milk, calculated at the average price received per 100 pounds, makes an average per cow of about $51.25 gross receipts.

For about the same number of butter dairies the average annual production is 252.5 pounds of butter per cow, calculated at the average price received for butter, 23 cents, makes $58 per head, not counting the skim milk.

From about thirty creameries and skimming stations reporting more than 10,000 cows, the average number of pounds of milk received per cow is 4,000 pounds, average price paid for milk at 73.3 cents per hundred makes $29.32 per head.

From eleven cheese factories reporting about 1,700 cows, an average of 3,514 pounds of milk per cow is made at 75 cents per hundred pounds, the average price reported for milk, makes only $26.35 per head.

There are probably more than two hundred creameries and skimming stations in the State, perhaps thirty or forty cheese factories, and a large number of private milk and butter dairies. From the reports we have at hand, aided by the census figures of 1890, we estimate the number of cows furnishing milk for these purposes to be 100,000. If these produce an annual product worth $45, which is much below that made by either the butter or milk dairies reporting, but above the amount for the creameries, we have a total value of $4,500,000. We estimate that 400,000 cows are kept on the farms primarily for raising calves, but from which a considerable quantity of butter is produced for home consumption and the surplus sold to local trade or to shippers. These cows produce upon an average 100 pounds of butter that sells for twelve and one-half cents per pound, which makes a total value of $5,000,000. To this should be added the value of the skim milk which is worth at a low esti-

mate $2.50 per cow or $1,250,000 making a grand total of nearly $11,000,000 worth of dairy products for the State.

This is certainly not a bad showing when we take into consideration the fact that practically nothing has been done by the State to develop the industry in Missouri. This calculation, it will be seen, does not reckon the value of the manure returned to the land or the calves annually raised, which at a low estimate would add not less than $10,000,000 to the amount.

THE FUTURE OF THE DAIRY INDUSTRY IN MISSOURI.

With a climate as favorable as the best dairy countries of the world, possessing a soil equal to if not superior to the same area anywhere on earth that will produce abundantly the best of dairy feeds at a nominal cost, accessible to splendid markets that are found within our borders and at our western door, with more than one-half million cows now in our pastures that may be brought into service, and last but not least an honest, industrious and intelligent people, who is ready to say that with a little encouragement from the State, it is impossible or improbable that Missouri may in another decade become one of the leading dairy producing States in the Union.

STATE ENCOURAGEMENT.

The last General Assembly recognized the importance of this industry when it provided by law for the establishment of a Chair of Dairy Husbandry, in the College of Agriculture and made an appropriation of $5,000 to sustain it. The authorities of the College assure our people that this Chair will be filled by an up-to-date practical dairyman, whose time, for the present at least, will be given entirely to field work. He will travel over the State, hold schools of instruction, and give private information where possible upon all the details of the business, thus taking the dairy Department of the College of Agriculture to the very door of the farmer.

The Forty-first General Assembly further provided, at a cost of $40,000, for building and equipping a dairy and live stock building on the grounds of the College of Agriculture, where the very best equipments will be furnished and the most competent teachers obtainable will

be employed. Will our farmers take advantage of this splendid opportunity to give their boys on the farm what the State offers free of cost? We do not think it ncessary to argue with the farmers, the benefits to be derived from a special and technical training. If, however, any of our readers doubt the value of this knowledge we refer them to the results of our reports, which show that one pound of butter produced by up-to-date methods brings in the market an average of 23 cents per pound, while the average butter carelessly handled will bring but 10 or 12 cents per pound. Most of this difference is frequently caused by the difference in handling and marketing after it is made.

MANUFACTURING AND MARKETING FARM BUTTER.

By C. L. Willoughby Instructor in Dairying, Missouri Agricultural College.

When good clean milk has been secured, the next steps concerned in the making of butter are to separate the cream from the body of the milk, ripen it, and churn out the butter.

There are two recognized methods of securing the cream—by the deep cold setting system, and by the use of cream separators.

The deep setting system depends for its action upon the force of gravity. In fresh milk the globules of butter fat are scattered through the mass in a finely divided state, or emulsion. The butter fat is lighter than the watery portion or serum of the milk, and if the milk is allowed to remain at rest for any length of time, these globules will rise slowly to the surface and collect in the form of cream. The efficiency of the deep setting system is therefore dependent upon two main conditions—the size of the fat globules, and the resistance offered by the watery portions of the milk. If the milk contains a greater proportion of large fat globules, they will rise more easily and quickly, while if the fat is finely divided into small globules, large numbers of them will fail to reach the surface and are lost in the skim milk.

If the milk serum becomes heavier or more viscous, it will greatly retard the movement of the fat globules. When cows are fresh in milk,

the fat globules are large, and gravity creaming is much easier and more effective; but as the period of lactation advances the globules decrease in size, and much more fat is lost by this process.

According to Dr. Babcock, of the Wisconsin Experiment Station, milk contains a small amount of fibrin, similar to the fibrin found in the blood, which if allowed to remain at temperatures between 60 degrees and 80 degrees will in a very short time from an invisible network or clot throughout the milk, holding many of the fat globules in its meshes and preventing them from rising to the surface. On the other hand—just as with blood—if the milk is cooled quickly to a temperature of 50 degrees or below, the formation of fibrin is prevented by the cold. The milk serum also cools more rapidly than the fat, becomes relatively heavier, and thus aids the fat to rise.

For these reasons, the most important part of the deep setting system is to set the milk in the deep cans in cold water within a very few minutes after it is drawn from the cow. Ice water is the best for this purpose, as it cools it more quickly. The temperature of the water should remain constantly as low as 50 degrees, and 45 degrees is better. It has been found in comparing temperatures of 45 degrees with lower temperatures of 40 degrees or 35 degrees that the difference in favor of the latter is so slight as to hardly pay for the extra trouble and ice. Forty-five degrees is low enough for all practical purposes. Fifty degrees will do reasonably well, but anything above 53 degrees or 55 degrees is very close to the danger line of heavy losses of fat in the skim milk. If a flowing spring or running water can be used, with water at a temperature of 53 degrees to 55 degrees, it will be very satisfactory, as the milk will cool much more rapidly if the water is constantly changing than if at rest.

The cans used in this method should be eight or ten inches in diameter and sixteen to twenty inches deep. Some of the patent cans which are covered so as to be entirely submerged in the water, and yet permit the escape of gas and animal odors are very efficient, as they furnish more cooling surface. But any vessels of the right shape will answer the purpose. The cans should never be tightly covered so as to prevent aeration, but the milk ought to have some protection from outside taints.

Within twelve or eighteen hours after setting, the cream will have

risen to the surface so as to show a distinct line of separation from the skim milk. Glass gauges in the side of the cans are very convenient in noting the separation. It will sometimes require twenty-four hours for all the cream to rise. The two portions of the can's contents may then be separated, either by skimming or dipping off the cream from the top, or by allowing the skim milk to run out from the bottom of the can if it is provided with a faucet for this purpose. The latter process is much more convenient and effective, as it leaves the cream in the can with very little disturbance if the skim milk is drawn off slowly and about half an inch left under the cream. In skimming from the top, the cream is more or less disturbed by the dipping process, and some of it is mixed again with the skim milk and lost. A conical or pointed dipper is best for such work. In using it, insert the point of the skimmer in the middle of the can and press it down slowly until the cream runs over the edges and fills it. Lift out carefully, and repeat this process until the cream is all taken off.

The deep setting system produces cream which is perfectly sweet, but rather thin, usually containing only eighteen to twenty-five per cent of fat.

The Farm Separator.—By the use of the cream separator a much more perfect separation of the cream from the milk may be secured than by any gravity system. This is shown by the increased amount of butter made when the separator is used, and also by the amount of butter fat left in the skim milk, as shown by the Babcock test. It has been found that no system of setting the milk will take out all of the butter fat; in fact, under ordinary conditions, a large per cent is lost. On the other hand, when the separator is used, practically all the fat is extracted. Under the very best conditions, the deep setting system will seldom leave less than .2 of one per cent fat in the milk, and the loss will range from this figure with fresh cows, up to a loss of one per cent or more with stripper cows. If the conditions are unfavorable, as much as 1.5 or 2 per cent of fat will be found in the skim milk. The average during the entire year of hundreds of tests of the skim milk produced in this system shows a loss of about .75 of one per cent fat.

But the farm separator if properly operated, will leave less than .1 of one per cent of fat in the skim milk. In fact, most users of these machines will not keep a separator that does not habitually skim so as to leave as little as .05 of one per cent fat in the milk, or less. This means

then that the separator will produce about three-fourths of a pound more butter from the same 100 pounds of milk than the deep setting process. And it also means that by the latter method, the farmer loses every year nearly one-fifth of his total butter product in the skim milk, with milk of average richness, containing say 3.8 per cent butter fat. With cows producing 4,000 pounds of milk per year, or 150 pounds of butter fat—which is a very reasonable average—this loss would amount to at least 30 pounds per cow, which at 20 cents per pound would be a loss of $6 per year on every cow. It will be seen that this loss soon becomes enormous in the aggregate. For example, in a herd of only ten cows it would mean a loss of $60 per year. The small sizes of hand separators can now be bought for $50 up to $125, according to size and capacity, and they will easily last several years with proper care. It is quite plain that no dairyman having as many as ten cows can afford to be without a separator in buttermaking, as the losses incurred by other systems of creaming would soon pay for the machine.

Besides this, the skim milk is in the very best condition for feeding to the calves and pigs if it is run through while fresh, and fed immediately after separation, while still sweet and warm. If the work of turning a hand-power machine should become objectionable, a light tread-power can be arranged to do the work. Any farm animal can be used for this purpose, such as a good sized sheep, a pony or horse that might otherwise be idle, or even the herd bull. Many farmers use the tread-power to furnish their dairy bulls the exercise which they need to keep them docile. Even turning the separator by hand does not require as much time and labor as setting and skimming the milk, washing cans, and warming the skim milk for the calves, as in other systems. The cream from the separator can also be regulated to any desired thickness, containing all the way from 15 to 50 per cent of fat. The best consistency for churning purposes is 30 to 40 per cent. When cream is separated while fresh there is much less danger from injurious bacteria, as these germs do not thrive so well in the medium of butter fat as in the whole milk or skim milk.

It has been claimed that the average farmer will never learn to run cream separators. But the machines are comparatively simple, and it will be no more difficult for the farmer to become sufficiently expert to secure good results from them, than it has been for him to learn within

the past fifty years how to operate such machines as the self-binder, corn harvester, thresher, and many other delicate and complicated pieces of modern farm machinery.

Before leaving the subject of creaming, we are compelled to mention another method which has been in use from time immemorial, called the shallow pan system. We shall speak of this method only for the purpose of discouraging it in unmeasured terms as a practice which will do more to reduce the quality of farm butter than any other system. It is the method used by our grandfathers and grandmothers, and much to our regret, it is still in use on a large number of farms in this country. After examining the process carefully, no fair-minded person could recommend it, when other methods are offered which are no more costly or troublesome and far more efficient. By this old method, the milk is set in shallow pans in layers not more than two or three inches thick. The vessels may be of any size, from a gallon crock to a pan large enough to contain the milking from several cows, as long as the depth of the milk is not over four inches. The milk must be set as soon as possible after being drawn from the cows. The temperature required for this method must be comparatively warm, usually about 60 degrees. Some forms of pans are arranged to allow water to flow around the outside, so as to cool them down quickly to the right temperature. The air of the milk room should be pure and free from all odors and dust, well ventilated and slightly moist. The milk must remain in this condition for about thirty-six hours, until the cream has collected at the top and hardened into a thick layer, and the skim milk below has thickened slightly and begun to sour. The cream can then be lifted off in chunks and rolls with a flat skimmer. No milk should be taken with the cream, as this sour milk will cause the cream to sour too rapidly. This cream can not be skimmed off while thin and sweet, as in such thin layers it mixes readily with the milk, and must either be lost or be accompanied by large quantities of the milk. If the atmosphere is too dry, the cream hardens accordingly, and produces specks of curd in butter.

There is no question but that a fine quality of butter can be made by this system when the best conditions are furnished, but the trouble is the farmer is absolutely unable to control the conditions. He is literally at the mercy of the wind and weather. The milk is spread out in thin

sheets and exposed to the air and bacteria, so that under changing atmospheric conditions, uniform results are impossible.

From this fact has arisen the old superstition that thunder will sour milk. The electric current, or its accompanying noise, thunder, has no effect on milk; but the warm, humid atmospheric conditions which invariably accompany thunder storms furnish just the right surroundings for the rapid souring of milk. If the milk is submerged in cool water, or protected in any way from atmospheric changes, it is not affected by thunder storms.

Fresh milk is highly susceptible to odors of any kind. Whenever the shallow pans are placed near anything which gives off the slightest smell or odor, the characteristic taint is sure to be absorbed and appear later in the butter. The practice of setting milk in a damp, moldy cellar which is often half filled with vegetables such as potatoes, onions, cabbage, etc., either fresh or in all stages of decay, can not be too strongly condemned. Likewise the housewife's method of setting milk in crocks in the pantry which opens into the kitchen; the smell of cooking vegetables and meat will surely injure the butter.

But most objectionable of all is the fact that the losses of butter fat in the skim milk by the shallow setting are enormous—much larger than by any other method. The skim milk seldom contains less than one per cent of fat, and the average is about 1.4 per cent loss; many times the losses reach as high as 2 and 2.5 per cent. This is actually a loss of from one-fourth to one-half of the total butter product.

The system also requires a large amount of labor in skimming and washing pans, and a large amount of shelf space for the exposure of the milk. The skim milk is always sour and loppered and is practically unfit for use.

Ripening.—After securing the cream, the next step is to ripen it properly for churning. The ripening process consists in developing a certain amount of acidity in the cream, in order to produce good flavor and exhaustive churning. This process requires good judgment, as no set rules can be laid down. Different conditions require different treatment. The sourness is produced by certain bacteria which break down the sugar of milk into lactic acid. The lactic acid bacteria are so common in milk that under ordinary conditions the only work necessary in producing acidity is to keep the cream at a temperature which is favorable to the

growth of these germs for a sufficient length of time. Sometimes it is best to use for ripening purposes a starter, a quantity of milk in which the lactic acid germs have been allowed to develop in large numbers. A good starter will usually produce a higher, cleaner flavor, and will tend to check and overcome any undesirable fermentations. Starters may be prepared from commercial ferments, or made at home. A satisfactory homemade starter may be some good clean whole or skim milk which has been kept at a temperature of 85 degrees or 90 degrees until it has become thick and sour; or some fresh buttermilk. Use about two pounds of starter for every 100 pounds of cream. The question of commercial starters is so broad and intricate that it is not deemed best to enter into it here. When cream is raised by the deep setting process, it usually contains a good start of acid at skimming, and will ripen readily without a starter.

It is essential to the production of firm butter that the cream be subjected to a temperature of 50 degrees or lower for two or more hours at some time early in the ripening process, in order to congeal the fats in milk which are always melted at temperatures of 85 degrees and 90 degrees—being in a liquid state when drawn from the cow. Unless properly cooled and hardened, these fats will be lost in the buttermilk. If the cream is raised by deep setting, it has already been treated to the low temperature of 50 degrees, and may be ripened immediately after skimming. But when the separator is used, the cream should be immediately aerated and cooled down to 50 degrees and held there some time before ripening begins.

Ripening is one of the most important parts of butter making, for upon it depends the quality and flavor of the butter. If the cream is spoiled at this stage by improper handling, the entire product is spoiled. Butter will have the best texture when the cream has been subjected to as few changes as possible from the cow to the churn. The acidity of all parts should be alike. When fresh cream is put into the cream can, it should be thoroughly mixed with the rest. No fresh cream should be mixed in within twelve or sixteen hours of churning, as it would not have time to ripen properly, and being slower in churning than the rest would become lost in the buttermilk.

Cream should be raised in temperature slowly and gradually, and stirred so as to allow all parts to heat equally. A correct dairy ther-

mometer is indispensable in butter making. No person can guess at temperatures correctly every time, and uniform butter can not be made without using a thermometer at almost every stage of the work and securing uniform conditions. A great deal of farm butter is spoiled by ripening at too high temperatures and allowing cream to become too sour. This is inexcusable when a floating glass thermometer now costs only twenty cents. Never pour hot or cold water into the cream, except in extreme cases. The can should be set in a larger receptacle and surrounded by water at the desired temperature. The process of placing the cream near a stove for heating is very objectionable, as it does not heat evenly.

If deep setting cream is used, it may be kept cold until the day before churning, when it should be raised to a temperature of 60 degrees or 70 degrees and held there for twelve or sixteen hours. When sufficient sourness has been developed, it should be cooled down for churning. The lower the temperature used in ripening, the longer time will be required. Sixty degrees would sometimes require twenty-four hours, and if it should become necessary to hasten the process, cream will ripen in six or eight hours at a temperature of 75 degrees or 80 degrees. It is best to use the lower temperatures of 60 degrees and 70 degrees when possible. It is hard to state on paper just how cream should look and taste when it is ripe and ready for churning. This is acquired only by experience. The cream should have a sharp, clean acid taste, with a pleasant flavor. It should have a peculiar smooth and glossy appearance, somewhat thick, but not loppered. By the acid tests it should contain from .50 to .60 of one per cent lactic acid.

Separator cream may also be ripened at 70 degrees, but it will require perhaps eighteen to twenty-four hours to become acid enough for churning. It may sometimes be raised as high as 75 degrees or 80 degrees, which will ripen it in about twelve hours. If a starter is used, it may be readily ripened at 60 degrees in a few hours. Thin separator cream will ripen much more rapidly than thick cream.

After ripening, cream should be cooled down to the proper temperature for churning, or somewhat lower, and held for a couple of hours, or longer if not convenient to churn at once.

Churning.—Churning is the agitation of the cream necessary to cause the particles of butter fat to unite into masses. This is best ac-

complished by some machine which produces a concussion by allowing the cream to fall or strike with force against the sides. The best forms are the revolving barrel or box churns, or swing churns. Any machine which churns by the use of moving inside fixtures should be avoided, as they agitate the cream poorly and unevenly, lose large amounts of fat in the skim milk, and produce dirt and heat at the inside points of contact. The old time vertical dash churn should be relegated to the past on account of the back-breaking form of work it has furnished for thousands of tired women, to say nothing of the wrong principle of churning on which it operates.

Preparing for Churning.—The churn should first be thoroughly scalded with hot water, and then cooled with cold water. The cream should be poured into the churn through a strainer, to avoid lumps and specks of curd. In the winter time enough color should be added to produce about the same shade as June butter. The necessary amount can readily be learned by experience. There are several good vegetable colors on the market which are entirely harmless, and full directions for use accompanying each package.

What is the Proper Temperature for Churning?—This question is asked oftener than perhaps any other, and the only correct answer is that it depends entirely on conditions. It is impossible to fix any exact temperature that will suit all cases. The best temperature for churning is the lowest temperature which can be used and produce proper granules within a reasonable time. A reasonable time is from thirty to forty-five minutes, and fifty minutes or an hour is not too long. The colder the temperature, the better the granules, and the less fat lost. The real churning temperature is the temperature at which the butter breaks. This is from two to four degrees higher than the starting temperature, from the friction of the machine. If the granules form in less than twenty-five minutes, you may be certain that the temperature was higher than it should have been. If the butter comes in fifteen minutes or less, a large amount of fat is lost in the buttermilk, and the butter will be soft and greasy in texture. Ordinarily from 56 degrees to 60 degrees is about the right temperature for churning under Missouri conditions, and it should very often be lower.

The conditions which affect the churning temperature are—the breeding and individuality of the cows, the composition of the butter fat

globules, the period of lactation, the feed of the cows, and the richness of the cream. The temperature should be higher when the cows are in an advanced stage of lactation, and also when they are on dry feed in the winter. When the cream is rich in butter fat, such as separator cream containing thirty to forty per cent, the churning temperature may be very much lowered, usually from 52 to 54 degrees. With thin cream from the deep setting system, a temperature of 60 or 62 degrees will be necessary.

The churn should be revolved at a speed that will produce the best concussion of the cream at each turn. The gases which are evolved by the agitation should be allowed to escape during the first five minutes. If the cream becomes so thick that it does not fall, it should be diluted with some pure water at the same temperature. One can soon learn to tell by the sound of the churn when the butter is beginning to break. It should then be carefully watched, as it is very easy to churn too much at this stage.

Fig. 1.—Butter in Granular Form—Proper Time to Stop Churning.

When to Stop Churning.—The churn should be stopped when the butter has formed in granules somewhat smaller than wheat grains. If there is any difficulty in producing granules of this size, a small handful of salt sprinkled in the churn will collect them with a few turns. The

next step is to separate the buttermilk from these granules, by drawing it off and washing with water. Our grandmother's method has been to continue churning until the butter forms in lumps the size of a walnut or the fist. If one would only think seriously about the matter, it must be plain that such methods will inclose the buttermilk, pieces of curd, etc., on the inside of these chunks so that it can never be removed by subsequent treatment. And how much easier it must be to drain off buttermilk and wash out milk and curd if the butter is allowed to remain in a finely divided state such as that shown by the accompanying picture, fig 1.

This is one fault of churning beyond the granular stage means a great loss, as such butter soon becomes rancid, and must be sold at a sacrifice.

As soon as the granules form, then draw off the buttermilk through a strainer or hair sieve, and wash the butter with pure water at a temperature of 50 or 52 degrees. Use about twice as much bulk of water as butter, and allow to stand only a few moments, unless it is desired to cool the butter very materially. Draw off the first washing, and if the last of it does not run off reasonably clear and free from milk, wash a second time as before. The writer can not recommend more than two washings, as every washing takes out just that much of the high aroma and flavor that is so much desired.

Salting and Working.—Nothing but good dairy salt should be used, and never the common coarse barrel salt used by many. The salting may be done in the churn, or the granules lifted out and salted on the worker. In a combined churn, of course the salting and working is all done in the churn. If the butter is salted in a box or barrel churn, about half the salt should be sifted on one side, the churn revolved, and the remainder sifted on the other side. By revolving the churn a few times, the salt will become fairly well mixed, and the butter should be taken out and finished on the worker. The difficulty with this method is that it seldom leaves the right amount of salt in the butter when finished. It is impossible to tell exactly how much moisture the granules contain, and when this moisture is worked out it will take with it large amounts of the salt. The ordinary market requires three or four per cent of salt in butter, which is about three-fifths of an ounce to the pound. To insure this amount, at least an ounce and a half of salt per pound of butter should be put in when salted in the churn, and even then it is hardly possible to get two successive churnings alike.

The writer is of the opinion that he best way to secure uniform saltness is to take the butter out of the churn in the granular form, and press it lightly on the worker without causing the granules to cohere much and yet allowing most of the water to escape. Then salt at the rate of one ounce to the pound and distribute the salt evenly through the mass and allow to stand until thoroughly dissolved. Then work it a second time to avoid mottles and streaks, and thoroughly mix the salt. The best temperature for working and packing butter is about 55 degrees. The least amount of working that will accomplish the object of removing the moisture and incorporating the salt is best for high flavor and good texture. It is very easy to work butter too much and destroy the grain. When finished, the granules should be so well preserved that they appear when broken like a section of broken cast iron. If it is impossible to keep the butter cool enough to allow time for the salt to dissolve and working a second time, of course very good work can be done with one careful working. There are many forms of workers, but the best for home use is the lever table worker.

Packing and Marketing.—Next to ripening and churning the cream, the most important thing is to pack and market the butter in an attractive form. The large majority of consumers base their opinion of butter on its flavor and appearance. A little extra care and neatness here will mean an increase of many dollars' profit during the year, while even good butter can be ruined for the market by slovenly packing. Anybody can make butter of some sort, but only a clean and careful maker can produce butter of good quality and market it in a pleasing form. So here is the final test of the artist in buttermaking.

There are as many different forms of packing as there are different trades, and each maker must pack to suit the trade he is supplying. As a rule, private home trade will pay the highest prices, and for this purpose pound prints are very acceptable. The molds turn out the butter in oblong blocks, either pounds or half pounds. They should be carefully wrapped in wet parchment paper, and kept cold until marketed. Others prefer butter in stone jars or wooden pails. The boxes made of pressed fibre are very cheap and convenient. In the large markets, the trade generally calls for 60 or 80 pound tubs. When wooden packages are used, they should first be steamed and cooled, and lined with parchment paper on the bottom and sides, to protect the butter. The butter should be

packed in firm and solid, and the top smoothed off either exactly level or slightly lower than the top. Then lay a cloth circle on top, and run a little salt into its meshes. Finally put on a parchment circle and fasten on the top of the tub. If the home market does not pay a reasonable price, or the demand is small, there is no question but that the farmer can secure good prices for his butter by shipping to the city markets and commission houses, if he will turn out the right sort of product.

THE DAIRY HERD.

By H. J. Waters, Dean Agricultural College.

The proper selection, maintenance and development of the dairy herd lies at the foundation of all permanent success in dairying. While the organization of factories, wherein butter and cheese may be manufactured more economically than on the farm, may stimulate and encourage the development of the dairy industry, it is nevertheless true that this stimulus well be only temporary and will soon fail if the farmers are producing the milk without a satisfactory profit.

A thoroughbred herd of dairy cows is not necessary to success. In fact, for the beginner, it is perhaps advisable for him to select the best dairy cows of his local community, which in this State will generally be grade Shorthorns or Shorthorns mixed with Jersey blood. The combination beef and dairy cow is claimed by many authorities to be the most profitable on the whole, inasmuch as the cow herself may be readily and profitably converted into beef when she proves unsatisfactory for dairy purposes; that she will drop a large and thrifty calf that may be made into veal or into beef at a profit, and in this way add materially to the profits of the business. On the other hand the preponderance of evidence seems to be on the side of the special dairy cow. The comparative tests show that such a cow will produce butter at less cost, just as the other type of animal will produce beef to a better advantage, and that in the end the dairyman will be acting most wisely who plans to form his herd out of such cows.

I. *Selection.*—After having gotten the herd together, the most rigid

selection and the most intelligent breeding will be necessary to improve its quality or even maintain its excellence. No matter how judiciously the herd may have been selected, there is almost certain to be a number of animals that will fail to produce a profit and a wide difference will be shown in the amount of profit returned by different cows. It is therefore absolutely essential to the most rapid progress and to the highest degree of success that the dairyman determine accurately the number of pounds of butter or milk produced by each cow each year. An investment of less than ten dollars in a Babcock milk tester and a pair of spring balance scales and an expenditure of a comparatively small amount of time and labor will furnish this information and it is certain to cause a great surprise to the owner of the herd.

As a striking illustration of the value of such a test, the following is mentioned: sometime ago a prominent dairyman—president of his state dairy association—applied the test to his own herd, not so much because he believed it necessary or advisable, but to satisfy his own curiosity. His herd consisted of cows of his own breeding and his sons did the milking. Before beginning the test, however, he made a note of the joint opinion of himself and his sons as to the best half dozen cows in his herd. When the year's record was complete, to his great surprise it was found that the best cow in his herd he had placed fifth in order of excellence, the second best animal was a cow not on his merit list and the fourth he had placed first.

A somewhat similar experience by the writer, while connected with the Pennsylvania Experiment Station, in a herd of twenty-five cows that had been milked for several years by two very intelligent men; and before the test was applied I asked them to select the best ten animals in the order of their excellence. The third and fourth cows in this list proved to be among the poorest of the entire herd and were so utterly worthless that they were sold to the butcher at the end of the year. The cow that these men placed second in the order of excellence produced a profit during the year of $4.55, while the cow that they placed sixth yielded a profit over and above the cost of feed of $37.65; and yet these were intelligent men and felt that they were thoroughly acquainted with the cows in this herd.

At the Wisconsin Experiment Station were made a number of yearly records of the cows in the herds of six patrons furnishing milk to their creamery.

"At farm 'A' the annual yield of milk ranged from 3,792 to 6,203 pounds, and of butter fat from 147 to 296 pounds. At farm 'B' the milk yield ranged from 5,193 to 7,887, pounds, and the butter fat from 245 to 312 pounds. At farm 'C' the milk yield ranged from 4,411 to 8,132 pounds, and the butter fat from 222 to 336 pounds. At farm 'D' the range of milk was from 4,847 to 6,570 pounds, and of butter fat from 223 to 300 pounds. At farm 'A' there were three cows which did not produce milk enough to pay for their feed. The entire herd of twelve cows gave a profit of only $75; $50 of this amount was from three of the cows, while the combined profit from the other nine was only $25. The twelve cows on farm 'C' earned a total profit of $228, instead of $75 as on farm 'A,' but even on this farm there was a considerable difference in the cows. The value of the product from the poorest cow was $37.96, and from the best $60.72. The best cow gave a profit of about $31, while the poorest gave a profit of only $8."

A record of one year of a herd of 25 cows at the Connecticut Experiment Station shows that the annual yield of milk varied in the case of different individuals from three thousand to eight thousand pounds and the annual yield of butter from 165 to 509 pounds. The best cow gave a profit (above cost of feed) of $42.82 while the poorest cow had been kept at a loss of $4.09. Eight of the twenty-five produced a profit of less than $10 each. The best cow gave as much profit as any three of the average cows of the herd. Thus this best cow was worth more than three times as much as the average cow of the herd inasmuch as the labor of milking and caring for one cow and of keeping her when she is dry is much less than of three cows.

At the New Jersey Experiment Station during the past four years the best cow of a grade herd produced a profit over the cost of feed of $46.64, with butter at twenty cents per pound, while the poorest cow yielded only $5.84 per year.

These cases are cited to emphasize the necessity of keeping a record of every individual in the herd and of weeding out all animals that fall below the limit of profitable production, without regard to their pedigree, their looks or their disposition. It is safe to say that a cow producing less than two hundred pounds of butter will not pay to keep. At the end of the first year all animals falling below this limit ought to be sold without delay.

While under ordinary circumstances a yearly butter yield of 200 pounds will pay all expenses and leave a little profit, no dairyman should be satisfied to let his standard remain at that point long. Even with his first crop of heifers, if he has selected his sire wisely, the standard might be safely raised to 225 pounds, and with each succeeding generation an advance of 25 pounds, until no animal is producing less than 300 pounds. This is a high mark but it may be reached in a surprisingly short time, with proper selection, breeding, feeding and management.

II. *Breeding.*—The progress made by weeding out the unprofitable animals in the herd will be short lived unless you are able to produce good animals from this foundation. For this purpose it is essential to have a high class sire. In all cases he should be a thoroughbred representative of one of the well established dairy breeds. Too great care can not be exercised in his selection, and under no circumstances should cheapness be a prominent consideration in his selection. He should be the offspring of a dam that is known to be a good dairy cow, and should be sired by a bull that has produced valuable dairy animals. Under no circumstances should a good individual of poor breeding be selected, and it is just as unfortunate to select a poor individual, even though he happens to have a fine pedigree. As an illustration of the possibilities in this direction, I cite an instance in my own experience at the Pennsylvania Experiment Station, where a two year old heifer produced in her first period of lactation three hundred and thirty-four pounds of butter. Her dam in her prime, produced but 260 pounds of butter in a single period of lactation. Clearly a portion of this superiority must be attributed to the sire.

An even more striking illustration is found in our experience with the Missouri Agricultural College herd of registered Jerseys. One bull used for two years—a comparatively cheap one—failed to produce a single heifer that proved superior to its mother. In other words, so long as we kept this bull our herd was at a standstill and all progress was barred. The next bull, apparently no better as an individual, but higher in price because he was the direct descendant of a family of heavy butter producers and was out of a cow with a large butter record, and was himself the sire of several tested cows, did not, in the three years he stood at the head of the College herd *fail in a single instance* to produce a heifer that was better than its mother. In this case progress was everywhere

apparent. No one, not even the State, could afford to own at any price such a bull as the first one, and any price within the bounds of reason would have been cheap for the second. Bear in mind that the bull is half the herd, that every heifer dropped takes half her blood from him.

III. *Development of the herd.*—Special attention should be given to the care and management of the cows. They should be developed as we would develop great speed in horses and great endurance in men. It should be borne in mind that the first two periods of lactation of a cow are the formative or training periods and that during this period especially, and at all times in general, she should be fed and milked regularly, should be properly sheltered, should be treated kindly, in short every reasonable effort should be made to induce her to become a copious and persistent milker. Fix this habit in the cow during her early life and she will retain it; in time she will transmit it to her offspring and you have a high class dairy cow in every respect.

IV. *Selecting and Breeding to a Dairy Type.*—After the unprofitable cows are eliminated, after we have made sure of our foundation stock, we should begin selecting and breeding to a dairy type. In no case, however, should we think of buying or keeping a cow simply because she happens to conform closely or even perfectly to what is considered the ideal dairy type. Unless she will produce a good yield of milk or butter at a reasonable cost she is worthless as a dairy cow. We keep cows for what they will produce. As a general rule the cow that most nearly conforms to the dairy type as distinguished from the beef type will produce milk or butter most economically and most profitably. This is strikingly shown by the results of the year's record of the dairy herd of grade cows at the Minnesota Experiment Station. They were all fed alike and a careful record kept of the cost of the food consumed and milk and butter produced. It was found that the cows representing the beef type, blocky and plump, produced butter fat on average cost of .175 cents per pound. The amount produced by these beefy cows was satisfactory but they required too much food for a pound of butter fat. A second group of four cows, approaching the beef type, but less blocky and plump, produced butter fat at an average of .151 cents per pound. A third group of three cows with spare and angular bodies, but deficient in depth and strength, produced butter for a cost of .146 cents per pound. A fourth group of twelve cows, spare and angular, with deep bodies and

large stomach capacity produced butter fat at an average cost of .121 cents per pound. These results exemplify a general rule which it would be well for every dairyman to observe. It is well known that there are individual exceptions, but in the main there is no doubt but the accepted dairy type should be as nearly approximated as possible in selecting and breeding our dairy animals. Under no circumstances would I advise the use of a bull that materially deviated from it.

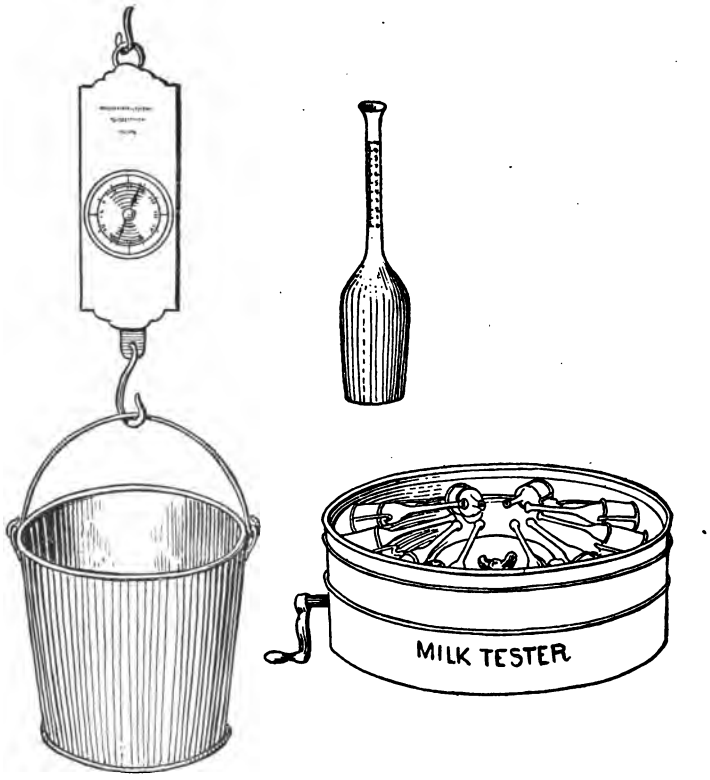


Fig. 2. Spring Balances for Weighing Milk, and Babcock Milk Tester from Allen, United States Department of Agriculture.

V. *Making the Test.*—Many imagine that a large amount of skill and labor and considerable record keeping are necessary to accurately test a herd. On the contrary the operation is quite simple and may be performed by any one of average intelligence without special instruction and with comparatively little labor.

It is not necessary for ordinary purposes to weigh the milk every day in the year although this is recommended. If the milk is carefully

weighed five days in succession in the middle of each month, say on the 13th, 14th, 15th, 16th and 17th, the yield for the whole month may then be computed with sufficient accuracy for all practical purposes. Provide a self-sealing glass fruit jar for each cow in the herd and during the days the milk is being weighed draw a sample of each cow's milk at each milking and at the end of the five days test it for butter fat if you have a Babcock tester, or send it to your creamery or to the Agricultural College to be tested. The daily samples are kept in the fruit jars until the end of the five day period and may be kept in good condition for testing by adding a small amount of such preservative as bichloride of mercury or bichromate of potash to each jar. After having computed the amount of butter fat produced by a given cow, add one-sixth to this amount to convert it into commercial butter.

FEEDING THE DAIRY HERD.

In the preceding article on the building up of the dairy herd much stress was laid on the selection, breeding and management of the animals for the greatest profit and the most rapid progress. Proper feeding is quite as essential to success and is quite as important a factor in the development of a dairy herd as any of those already mentioned. All of these elements of success must be considered together. They can not be separated and one set above the other in importance. For, a herd however well selected and highly bred, will fail to produce satisfactory results unless properly fed, and not only so, but these animals will ultimately lose or fail to transmit the high qualities that a combination of good selection, good breeding and good management and good feeding produced. On the other hand if the selection has been improperly made, no amount of intelligence in feeding will suffice to produce satisfactory profits.

The two most common mistakes are:

(1) In feeding an improperly balanced ration.

(2) In feeding an insufficient amount.

As to the balancing of the ration, it may be well to divide our common feeds into two classes, as follows:

Class I. Embracing such feeds as corn, corn fodder, timothy hay, millet, sorghum, oat straw, etc., which contain a large amount of fat or heat

producing material, but are notably deficient in the elements required for the production of muscle, growth in young animals and the casein or cheese portion of milk, etc.

Class II. Embracing such as cottonseed meal, linseed meal, bran, ship stuff, oats, clover hay, cowpea hay, etc., which supply the muscle and milk-making qualities lacking in the first class.

In Missouri the foodstuffs in class I are much cheaper and more abundant than are those of the second class, with the exception of clover and cowpea hay and should always form the foundation or basis of the ration, but should not, on account of their cheapness, be fed exclusively as is too often done.

A proper combination of the two classes will balance the ration, increase the flow of milk and the amount of butter produced, and will materially increase the profits returned.

It is often a question in the minds of the beginners especially as to whether the increased product obtained by balancing the ration is not more than offset by the increased cost of the feed. If the selection of material for balancing the ration is not wisely made and advantage is not taken of the market this may easily occur, yet if the feeder will make a careful study of the feeds ordinarily produced or sold in his locality and combine them to the best advantage, the cost per cow per day need not be materially raised, while the yield of milk and butter may be largely increased.

A few reasonably well balanced rations made up from material that is within easy reach of every dairyman every season will suffice to illustrate the point:

1. Seven to 9 pounds of corn, 3 pounds of bran, 15-18 pounds of clover hay.

2. Seven pounds of corn, 3 pounds of oats, 15-20 pounds of cowpea hay.

3. Ten pounds of corn, 20 pounds of cow pea hay.

4. Seven pounds of corn, 3 pounds of cottonseed meal, 10-15 pounds of corn fodder.

In all of the above rations it is expected that all the hay the cows will eat will be given and that they have access to good corn fodder during the day. The amount of grain will need to be varied according to the production ond size of the cow.

Observe that corn is the prominent grain in all these rations. While

much has been said against this grain as a dairy feed, it is nevertheless a fact that for cheapness and efficiency it is unexcelled, and for the greatest profit, must form the basis of all dairy rations. It is only when it is used as the exclusive grain ration and in combination with such roughness as corn fodder, timothy, sorghum, or millet hay that these criticisms apply.

It will be observed further that timothy hay is not included in any of these rations. Ordinarily it is too expensive to be fed to any class of cattle with profit. The dairy farmer will not find it profitable to grow timothy except for pasture unless he has a surplus of land, and even in that case it will be much better to devote the land to clover or cow peas. Whatever the ration fed, the cows ought to be allowed to run to good bright corn fodder when out of the barn during the day.

The corn ought to be ground for dairy cows, and unless some light bulky material such as oats or bran is mixed with it, better results will be gotten from crushing the corn and cob together than from the same quantity of shelled corn ground, and at less expense.

As between bran and oats there is a slight difference in favor of the oats. Thus when bran is selling at $10 per ton, oats will be a cheaper feed at 16 cents per bushel.

As between cottonseed meal and linseed meal, the experiments show that for the production of milk, butter or beef a ton of cottonseed meal has from $2 to $3 more value than has the same amount of linseed meal and it can usually be bought at from $3 to $6 per ton less. When cottonseed meal can be bought delivered to your railway station, at from $18 to $20 per ton in car lots, as it usually can in the fall, the dairymen of each community ought to club together and buy at least a car to protect themselves against a rise in the price of bran and oats, which usually occurs about the middle of the winter of each year. Cottonseed meal at this price is far cheaper than bran at $15 per ton or oats at 25 cents per bushel.

As between clover hay and cow pea hay, very few accurate experiments have been made, but these together with considerable practical experience, at the College and by local dairymen, indicate that cowpea hay is better than clover. The cows will eat more of it, and it goes further toward balancing a corn and corn fodder ration than clover. Both, however, are most excellent dairy feeds and every dairyman ought to make sure of a liberal supply eyery vear. A few very successful dairy farmers have for the past three or four years fed only corn, cowpea hay and corn-

fodder and claim that the butter yields are quite as large as when they paid out large sums of money for bran and fed it in connection with corn and timothy hay. Corn and good cowpea hay make a fairly well balanced ration.

After the dairyman has his business well established and on a paying basis, a silo in which to store green corn for winter feeding will be the next important improvement to be made,

The Amount of Feed.—Less satisfactory and accurate advice can be given on this subject than perhaps upon any other in connection with dairying. Scarcely any two cows will require exactly the same amount for the most profitable production. Certain it is that any satisfactory dairy cow may be under fed and on that account fail to return the largest profit of which she is capable. It is likewise true that the average cow may be over fed, that is given more than she can convert into milk and butter economically, and as a result the profits be reduced. Most feeders, however, and especially beginners, err on the side of under feeding. Frequently a bunch of cows is picked up in a neighborhood—a few in a place—that will not average over 150 pounds of butter per year under the care and feeding they have been receiving, but when fed a better balanced ration and more liberally will produce an average of 250 pounds —this increased production meeting the increased cost of feed and paying a good profit besides.

The proprietor of the herd ought, if possible, to do the feeding, and the requirements of each cow should be carefully studied. The food record and the milk and butter record of each cow should be watched as closely as would be the receipt and expenditure charts of any other business enterprise. By this it is not meant that the food of each cow could be weighed and a record kept with profit, on account of the great amount of labor, but the feeder will be able to approximate very closely the amount of grain each animal is consuming. As long as an increase in the amount is followed by such an increased production as to pay a profit the animal is certainly not over fed. As a general rule a good dairy cow ought not to lay on much fat when in full flow of milk. If she does, the chances are she is being over fed. On the other hand if she milks down very thin the probabilities are that she is not being fed enough for the best results.

MISSOURI STATE DAIRY ASSOCIATION.

KANSAS CITY, MO., THURSDAY, FRIDAY AND SATURDAY, DECEMBER 20, 21 AND 22, 1900.

WHAT PATRONS SHOULD KNOW.

W. W. Marple.

Mr. President, Members of the Missouri State Dairy Association, Ladies and Gentlemen:

Were I to take the time necessary to tell you what, in my opinion, creamery or milk patrons should know, the entire time of this convention would be consumed. When the time came for the closing of the last session, on the afternoon or evening of the third day, I would be found standing here proclaiming to you the extent of the knowledge necessary, or, at least, desirable, for the milk patron to possess.

If I was going to make this appeal attractive to you on account of its brevity, I would simply enumerate the things not necessary for the patron to know, and say all other things he should know, and the time consumed would be less than the time necessary for a calf to upset a bucket of skim milk, the first time it undertook to learn to drink.

This subject comprises a wonderful field for thought and discussion —a field as broad as that portion of the globe in which the cow lives. It reaches as high as the price of creamery butter in January, before the introduction of oleomargarine, and as low as the price paid by Kansas City commission merchants for country butter shipped to them by the country merchant in salt barrels, boot boxes and gunny sacks in the spring. Its influence is felt equal to that of a railroad lobbyist at a state legislature. I think I appreciate the magnitude and the importance of this subject, and I seriously wish everybody interested might be made

NOTE.—On account of limited space a full report is not here pulished.

to feel it. While there may be some especial points that the creamery man or cheese maker or milk buyer desires to impress on his patrons, I would only limit the knowledge of a milk patron by his capacity and opportunity. The scope should be boundless; the amount unlimited and confined to no special line. I would require this education to be of the highest type, of the most general character, in fact, a thorough education in its broadest sense. My object would be to lighten their labor, heighten their pleasures, broaden their view, increase their profits and make them better satisfied with their business. I would have them thorough mathematicians, in order that they might calculate the value of a cow, or a herd of cows, and the value of the business. I would have them botanists, that they might study the herbs of different kinds consumed by the cow, thereby adding interest to the business, broadening the field for thought, and lightening the manual labor through the influence and development of the mind. I would have them chemists, that they might analyze the food and the milk and the waste and the land on which their cow food grew, and thereby be able to dispel from their minds forever the idea that skim milk will kill a calf. I would have them linguists, that they might talk Latin to a vicious cow or an obstreperous calf, and thereby avoid making the air blue and shocking the nerves of the larger portion of a township, by using language that would be unavoidable in the absence of a knowledge of the dead languages. I would have them painters, that they might adorn their homes with pictures of their faithful cows, not alone as ornaments, but in addition, as reminders of the source from which they get so many of the necessities and luxuries of life. I would have them musicians, that they might sing praises to the dairy cow, Missouri's uncrowned queen—the mortgage lifter. I would have them veterinarians, that they might more thoroughly understand their wants and minister to them, and relieve the distress of the brutes that contribute so much to the wealth of the country. I would have them historians, that they might have a thorough knowledge of the cow and her ancestors, and increase their appreciation of her by a knowledge of the wonderful part she has taken in ancient and modern history, in sacred and profane history; how she, thousands of years ago, furnished the important dish for a feast for angels; how she furnished acceptable sacrifices under the old Jewish dispensation; how she furnished the

principal product for a country that was the richest inheritance of God's chosen people—a land of milk and honey; how, in modern times, she was tied behind the old dust-covered emigrant wagon, and as it crossed the Father of Waters, she followed, and as she invaded the Missouri forest and plain, she prepared the way for civilization and made it possible for us to enjoy this country; how she is a mother of her own children and a foster mother of many of . ours; how, when times were hard and crops poor, she picked up the burnt blades of corn, the dry grass, the Russian thistle and the yellow pumpkin, the potato peelings, thrown out at our kitchen doors, and made out of these almost worthless articles a product that was placed on the market in exchange for flour, coffee, sugar, clothing, children's shoes and chewing tobacco.

I would exclude no line of study, feeling assured that a thorough knowledge of each would contribute something to the success of the business possessing such a wide field for thought and offering such a reward for ability. I would most certainly place the milk patrons upon the same high plane as men in any other business or profession, and assure them that the same reward was in store for superior knowledge in their line as in others. I would be as far from saying that any man was fit to carry on a dairy as I would that any man was fit to practice medicine or law, or preach, or run a bank or a railroad. A man might read Dr. Jayne's, or Ayer's almanac and practice medicine; he might learn to say, "Stick out your tongue," or "Let me feel your pulse," but without increasing his information, he would not make his mark in the medical profession. He might attend two or three law suits and commence practicing law, deeming the experience in a country debating school all that was necessary to win a law suit, but without more extended information he could not expect to be successful. A man might brake on the front end of a freight train for two or three trips, and still need further information to make a good general manager of a railroad. A man might be competent to change a $10 bill, and not be competent to run a bank; and so on in the different lines of business and different professions. A man might know which side of a cow to get on to milk (and this is one of the things necessary for him to know, for his own safety and comfort), and yet need further information to be a good and successful dairyman or milk patron.

I believe in the theory of a general education, facilitating work and enhancing the results. Some of the points to be gained by this information, and that I would make specific mention of, as a wonderful aid in removing obstacles, are as follows:

The ability to calculate on a profitable cow. A man generally seems to value his cow for some special reason, in recommending her he has a paramount issue. It may be her color, her disposition, the quantity of milk she gives, the test or quality of that milk, the length of time, the amount of feed she consumes, and so on.

A cow that gives fifty pounds of 2 per cent milk per day, which would mean one pound of butter fat, that is worth twenty cents, and she eats thirty cents worth of feed to produce it, would not be profitable. A cow might give 5 per cent milk and give so little of it that there would be no profit. A cow might give 5 per cent milk and a large daily quantity, but give it such a short time that she would not pay. I would have patrons know that the profitable cow is one that milks ten or eleven months in a year; that gives a good quantity of milk; that is at least a fair quality, and at the same time that does not require too much to eat to produce this result.

Next, I would have them know that it is as impractical to try to do a profitable dairy business with one cow as it is to do a wheat business with one acre, or a cattle feeding business with one steer, or a corn business with a garden patch. I would have them figure in that as in any other business, that to a limited extent, by increasing the number of cows and the amount of milk, the proportionate expense is reduced and the profit is increased. In preparing winter quarters for milk cows, it requires comparatively little more expense to provide shelter for twelve than it would for six. The extra time to feed them and milk them would hardly be missed; it would not require one minute more time to haul the milk of twelve cows to the creamery than it would the milk of six cows.

Next, I would have them more fully realize the very close relationship existing between them and the creamery man. The success of the creamery depends very largely on the patrons, and the success of the patron depends to a great extent on the creamery. The patron should know that whatever expense there is connected with the handling of his milk and making it into a finished product, must be borne by him, con-

sequently he is interested in reducing that expense to the minimum; so, as he increases his herd of cows, he not only gets better results from economy of time, but also increases the receipts of milk and thereby reduces the cost of manufacturing, and receives an additional benefit from that source. The creamery man and the patron are partners in every sense of the word, and their interests are identical. The hope of the creamery man's success lies in the patron's success, and *vice versa,* the hope of the patron's success lies in the success of the creamery. When they form an alliance to do business, they are almost the same as married, and become one family, and it is a serious matter to allow anything to come up that will give legitimate cause for a divorce. Then, with a full realization of this fact, I would have the patron feel the importance of each studying the other's interest and impress upon him that the very close relationship warrants frequent business meetings, an interchange of ideas, perfect harmony, and the highest appreciation of good counsel and advice.

I would have the patron know that if he didn't deliver his milk and someone went after it, he had to pay for it. I would have him know that in many instances the time now spent by the good housewife in taking care of the milk and doing the churning would be ample time to take the milk to the creamery, and so much easier. I would have them know that when their neighbors failed to patronize the creamery, and the receipts of milk were diminished, the cost of manufacturing a pound of butter was increased, and they had to pay it; consequently each patron is interested in getting new patrons and securing constant patronage.

A teacher goes into a community and says: "I will take fifteen pupils at $2 per month each; or I will take twenty pupils at $1.50 a month each." Every patron of the school tries to secure the additional five. This works on exactly the same plan. Why doesn't everybody work? I would have them know that promptness in the delivery of milk is important. The majority of the patrons of a factory may get in by ten o'clock; one or two may not come till eleven or twelve. This makes it necessary to keep up the fire for an additional hour or two longer. This requires fuel; fuel costs money, and the patron pays it. The creamery or skimming station operator might have been through and putting in his time at something else; time is money.

The livery man says he will take you to a certain place for a dollar,

but you say there are two of you. He says he will take you for seventy-five cents a piece. It is easier to make one trip with two than two trips with one. A man figures on doing your threshing. He asks how much you have. The rule used to be, if a very small amount he would charge so much for setting the machine and so much a bushel; if a large amount, so much a bushel, and nothing for setting the machine. A hackman in the city may drive you a mile for twenty-five cents; he goes in ten minutes; but you stop four or five times and you consume two hours; he charges you by the hour, and it costs you a dollar. To go right through, twenty-five cents. This is on the same principle. The patron pays for the losses incidental to a neglect of duty or unnecessary consuming of time.

After the patron has done all he can to increase the quantity, economize on time, and thereby enhance the value of his milk, I would have him know that a good market is very important, and interests him directly. He is fortunate who has a buyer for his milk that has found a good market, and he should remember that he had something to do in securing that market; and farther, he will play a very prominent part in retaining it or destroying it. One of the requirements to retain it and hold up the price is quality. To make good butter requires good, pure sweet milk, from which to take the cream. It is impossible to take milk to the factory in a dirty can, or milk that has been exposed to the fumes of a foul stable, or milk tainted with the odor of some objectionable food eaten by the cow, and have good butter made out of it; and if this kind of product is used, and the butter is placed on the market, the price goes down; the patron suffers; possibly a customer is lost, or some special brand of butter has had its reputation ruined, all on account of one patron's carelessness. So I would have the patrons know and feel the importance of taking good care of their milk. Next, I would have them know that a very paying part of the business is in using the skim milk to raise calves and hogs. I might elaborate on this particular phase of the subject, but it is going to be taken up at this convention, and the man appointed to discuss this subject is a guarantee that it will be ably handled.

I have in my mind another subject on which the milk patron can not get too much information, that is the Babcock test. I would have the patrons know that there is no other way by which the true value of milk

can be determined; that, properly handled, it is absolutely correct. I would have them know that there was a better way to improve the test than by kicking. I would have them thoroughly acquainted with this test, and the principle involved, and by so doing remove all suspicion that so often exists, to the detriment of good feeling on the part of the patron, and success of the business.

And now, my friends, in conclusion, I want to say that besides the specified reasons for which I would have the patrons take up the different lines in connection with this work, I want to again reiterate, I would have them gather this fund of information for the one grand purpose of increasing their confidence in the business, and making them proud of their chosen profession. The cattle king is disposed to look upon the dairy business (if not the man) with contempt. The famous corn producer regards him with disgust; the wheat magnate with disfavor, and the manufacturer of oleomargarine with pity. In their minds, the business is small; it is insignificant. They are prone to say: "It is a woman's business," with emphasis on "woman's." Did you ever hear a great, big, stout, hearty man say religion, or going to church, was all right for the women and children, but it was poor business for men to fool with? Did you ever see a man who spent five days in the week riding around on a nice saddle horse pretending to trade, and on Saturday put on a clean shirt, washed and ironed by his wife, and go to town in a nice covered buggy, taking with him a nice lot of butter, made by this same good wife under the most trying difficulties, for the purpose of discussing how small the dairy business is, and incidentally trading this butter for such commodities as are required by the family he loved so well? Have you noticed him go into the store, and, after agreeing on the price, take in exchange about 33 1-3 per cent in something for the family to eat or wear, and 66 2-3 per cent in chewing tobacco, to be used by the man who doesn't believe in dairies? I would have the milk patron know that all other business sinks into insignificance as compared with his, from a point of magnitude. I would have him remind the cattle man that if the material he deals in was taken off the market, the cattle man would be out of business. I would have him cite to the wheat man instances without number where he was compelled to do a dairy business to make something with which he could pay the loss on the wheat business. I would have him laugh at the corn man for hauling

his corn five or six miles over a rough road, when his cow offered more money for it right at home. I would have him remind the oleomargarine man that Mr. Grout would discuss the question with him. I would have him know the necessity of subscribing for and reading good daily literature, from which he can learn of the wonderful volume of business done in his line, and the business reputation and character of those engaged in the business. I would have him know that ex-Governor Morton of New York, the man who counts his money by the barrel, is engaged in the dairy business; that a Vanderbilt, who built a house on his North Carolina farm that cost about six million dollars, when he got ready for business, stocked his place with dairy cows, and that he didn't do this from necessity—he had plenty of money to buy threshing machines, binders, corn planters and red cultivators with spring seats on them.

I feel that I am taking up too much time, but am free to confess, as I ride over this country, so rich in dairy resources, every cow I see seems to suggest some new idea. My mission will not have been in vain if I succeed, eventually, in impressing everybody with whom I come in contact that is connected with the production of dairy products, with the importance of this work, the responsibility, the respectability, the dignity and the high character of this business. I would have the male patrons know that the milk man is as much to be honored as the congressman; that the boy who drives the milk wagon is entitled to all the privileges in society and otherwise, of the boy who drives an ice wagon or a circus wagon or an express wagon, or automobile; that the milk maid can be just as handsome, just as sweet, just as accomplished, just as refined, just as literary, just as well educated, just as smart and just as dignified as the house maid, the chambermaid, the waiting maid, the bridesmaid or the old maid. I would have them know that this business, that is sometimes made fun of, has been the means of paying more mortgages, beautifying and adorning more homes, brightening more hearts, clothing more people, educating more children, making more goods, buying more good easy buggies, filling more Christmas stockings, and making more happy homes, than any other single industry in the world.

EDUCATING DAIRYMEN.

PROF. G. L. MCKAY, Ames, Iowa.

When we look over the list of the world's products we find the farmers are nearly all doing the same thing. They are putting their surplus products in the same granaries of the world, and those granaries are setting the prices for all. The prices in New York, in Liverpool, and in Calcutta are all about the same, less freight.

The supply in various countries has increased so much that it has made the consumer fastidious in his taste, and only the finer grades can command a first-class price. It is necessary that our butter and cheese should be made up in as perfect condition as possible so they can bring the top prices either at home or abroad. This can only be brought about by educating the patrons as well as the makers. Do you suppose the great state of Iowa could have exported $33,000,000 worth of butter besides what was consumed at home, as we did in 1896, if all the butter had been made in a haphazard manner, as is done on many farms?

I sometimes feel sorry for the local grocer who has to set a certain price on butter, regardless of the quality, when some of it is hardly deserving of the name of butter. This reminds me of a merchant who had to take dairy butter in exchange for merchandise. He made up his mind to pay according to quality, so he told one of his customers who was in the habit of bringing the poorest butter, that he was going to pay according to quality. She said she was glad to hear it, as she had been bringing butter there for eight years and had never received a cent extra yet.

The Farm Dairy.—New conditions have come up that may possibly largely revert the butter-making to the farm again. I refer to the introduction of the hand separator which seems to be growing rapidly into popularity. If this popularity is a fad or if it has come to stay, I am not prepared to say. One thing is certain, if we expect to continue making a uniform grade of butter, it must necessarily be manufactured in a creamery.

I have no objection to the hand separator. In fact, I think it is a good thing in the hands of a competent person, when there are enough

cows to warrant using one. Still, I think the creamery is the place to make the butter. The little separator will never become very popular or practical as long as it has to be operated by hand power. I have made numerous tests of skim milk from hand separators from different parts of the state, and have found in some cases as much as one and one-half pounds of butter to the hundred left in the skim milk. This was probably due to the hired man getting tired or a boy operating the machine. At any rate, it was evident that they did not get enough centrifugal force to cause a thorough separation of the fat from the milk. I believe every creamery should send milk back in such a condition that there would not be the same necessity for the little separator as there is at the present time.

At Our College Creamery we use a Reid Pasteurizer and heat all our milk to a temperature of 165 to 175 degrees Fahrenheit. We have no guess work about this, consequently all our patrons get their milk back in good condition for feeding purposes. One patron reported to me that he had raised twenty calves during the winter on skim milk and sold them in the early summer for $25 each. I believe that before many years we will have a law the same as they have in Denmark, compelling all creameries to Pasteurize their skim milk, thus preventing the spread of diseases, such as tuberculosis. The patron who cares for his milk and sends it to the creamery in good condition, has a right to expect good milk back in return. If the creamery man takes in sour or impure milk, he is doing a great injustice to the man who is sending good milk. You will invariably find that the man who sends the poorest milk makes the greatest fuss about getting good milk back. There is one thing certain, if you receive sour milk you can not return sweet milk, no matter what process you put it through. There is more need to-day of a farmer keeping an inventory of his business than there has ever been before.

With the advance of civilization throughout the world, competition becomes keener in all lines of business.

New York State, not many years ago, tried to control the dairy business of the country. It was thought at that time that the grass in the west would not produce good flavored butter; yet two years ago at the great national contest, when all the leading dairy states in the Union were competing, including the great state of New York, the butter made at our school scored the highest on flavor of any butter there.

So we see the making of fine butter is not confined to any place or locality. Our competition comes to-day from all parts of the world. You can send butter from here to New York for little over one cent per pound, and for very little more, you can send it to London, Liverpool or Manchester.

The English ships go to all parts of the civilized world, laden with their manufactured products, and on their return trip take back dairy products sometimes simply as ballast. Cheese or butter from New Zealand or Australia can be laid down in Liverpool for one cent per pound. This means that we must study economy in the cheaper production. We can not carry on our business by changes or signs of the moon now. That is a thing of the past. Skill and science have their sway now.

Must Study Economy of Production.—I was reading some time ago of that great multi-millionaire Rockefeller's report to congress on trusts. In it he said that trusts were not necessarily detrimental to the people. He said in his business he got no better railroad rates than his competitors. He maintained that his success was due to a study of producing a cheaper and better grade of goods for the people. This was done, he said, regardless of the expense of changing machinery when it was found that other machinery could do the same work more economically. This same principle must be applied in all lines of business. Many of you keep cows that give you no returns. They are simply boarders. This reminds me of a lecture that I heard that eminent colored man, Booker T. Washington of the Tuskeegee Institute give. His theme was the education of the colored man so that he could compete with his white brother. This, he said, would settle the question of what to do with the colored man. One of the most striking contrasts that he had seen was the poor old colored man down South with his old wooden plow, string harness and old mule, trying to prepare the ground for corn and planting it with a hoe, competing with a white man up North who sits on his planter with an umbrella over his head, planting two rows at a time. I frequently think of this when I see some of our farmers trying to make money dairying with a scrub cow. Now it takes about $25 to feed the ordinary cow one year. This we have found out by actual experience at our school. We have opened up an account with each of our cows. We charge them with the food they consume and give them credit for the butter they produce. It will surprise you

to see the record of our herd before we began to weed them out. We had some cows that gave us a clear profit of $50 per head; we had others that ran us in debt $1 or $2; that is, they did not actually give us enough butter to pay for their food. If you tried dairying with this kind of cows you would certainly fail.

If your cows will not produce butter for less than 16 or 18 cents per pound, you can not successfully compete with the man who has cows that will produce butter for six cents per pound. There is no need of any one keeping inferior cows at the present time, who is sending to creameries, as any creamery man I think will be pleased to test the milk from each cow and by weighing the milk each time you can soon tell if your cows are a source of profit or loss.

Go into almost any creamery or factory in any state and you will find some men who are possibly receiving from $40 to $50 per cow. You will find others sending milk to that same creamery who are averaging probably not over $10. Now if a meeting could be called once or twice a year and these patrons gotten together to discuss these points, the $10 man rubbed against the $50 kind of man, and things evened up a little, it would be better all around. While dairying is one of the surest occupations man can engage in, it is at the same time a business that demands close attention, and unless a farmer can see a good profit ahead he will not follow this line of work. To show what some dairymen are doing, I will mention the names of a few whom I have met. Last year when in conversation with John Armstrong of De Smet, S. Dak., on the cow question, he informed me that he had a herd of 25 cows that he had selected by the aid of the Babcock test, that brought him an average of $67 per cow. Now, say we take off $25 for feed, this would leave him a clear profit of $42 per cow. If it is possible for Mr. Armstrong to do this, may it not be possible for others to do the same? I have a friend in Grundy county, Iowa, who is one of the most successful stockmen I know, Mr. George Swan. He made a fortune in sixteen or seventeen years in dairying and stock raising. I saw his average run as high as $8 per month for each cow. These cows were selected with the aid of the Babcock test. He usually did most of his milking during the winter months, having his cows fresh in the fall. The calves were all raised during the winter months and were old enough to feed nicely on the fresh grass in the spring.

A Canadian Dairyman.—Not long ago I had the honor of being one

of the speakers at a meeting of the Western Dairymen's Association of Ontario, Canada. At the close of that meeting, when a banquet was given by the citizens, a typical old farmer, E. D. Tilson of Tilsonburg, got up to respond to the toast of the dairymen. I was surprised at his remarks and at the same time pleased, so much so that I went 100 miles out of my road to visit his farm and herd. He said he had a cow that had given 17,720 pounds of milk in nine and one-half months, making 770 pounds of butter. He further said he had a herd of 55 cows that gave an average of 12,000 pounds of milk each during the year. He told me that the cow that had made the big record for nine and one-half months had given over 20,000 pounds during the year. This cow was sired by a full blooded Holstein. The dam was a full blooded Shorthorn. In fact, his best milkers were crosses between Holsteins and Shorthorns. This he found to be a little detriment when selling his full-blooded Holsteins.

Mr. Tilson's barn is possibly one of the best dairy barns in America. It is a massive brick building, perfectly ventilated. It is ventilated by what is termed a sub-earth duct. This consists of an underground drain about eight feet below the surface, extending out about 100 yards beyond the barn. In this drain he has a 16 or 18-inch sewer tile. Connected with this at the far end is a standpipe extending up about 20 feet high. On the top of this is a hood which adjusts itself with the wind so that the opening always faces the wind, thus permitting a current of air to pass down through the pipe under the ground and up into the stable. He also has top ventilators extending out through the roof, thus the air is cool during the summer and warm during the winter months. The cows are kept in the stable the year round except a little time during the heat of summer, when they are turned out nights. Fresh water flows through each stall. Mr. Tilson looks upon every cow as a machine and feeds what we term a balanced ration. He feeds about 40 pounds of ensilage per cow. He has a big silo in the center of his barn. He also feeds six pounds of bran, two pounds of oil meal and two pounds of pea meal per day, giving them six or eight pounds of cut straw and chaff as a roughage. With his ensilage feed he keeps up the flow of milk the same the year round.

I find that a number of Canadian farmers are managing the same way, keeping their cows in most of the time, and using ensilage to keep up the flow of milk.

The Western Way.—As a general thing, a western dairyman feeds his cows too much the same as he feeds his steers and hogs, mostly on corn. A cow is not allowed by nature to give milk containing fat alone, as this would not be suited for the calf, for every 100 pounds of milk must contain about three and one half pounds of curd or muscle-producing food. Now, this muscle producing food, known as protein, must come from the cow's food. If there is not enough in the food, the cow reduces the amount of her milk to correspond. Corn is a splendid food to fatten animals and an equally good food for dairy cows if something else is given to help supply the flesh-producing or protein, as this necessary food exists in too small quantities in corn if this is used as the chief food. The cow takes in so much fat-forming food to get the protein that the fat can not all be used in the milk, but is put on the body instead, and whenever this fattening begins the tendency is to reduce the flow of milk.

The Right Way.—I believe it would be an advantage for our farmers to feed more bran and gluten feeds in connection with their corn. These foods contain large quantities of the protein which the corn lacks. We find there should be about one part of protein or flesh producing food to about seven parts of fat producing food, in order to keep up a good flow of milk. Where clover hay is to be had it helps greatly, as it contains the elements which corn and timothy hay lack. On the farm we have an abundance of fat producing foods. What troubles us is, how to get enough protein to balance up the food we have. When we buy a ton of bran for $10, it contains 250 pounds of digestible protein. Theoretically we are paying the $10 for the 250 pounds of digestible protein, as we have the other elements of the bran in abundance on the farm; but we can not value bran altogether in this light, as it is a valuable food used in connection with the heavier foods, such as oil meal. Figuring oil meal on the same basis, which contains about 586 pounds of digestible protein, it would be worth $23.44 per ton. Prof. Haecker of Minnesota has prepared a table like this: When bran is worth $10 a ton and oil meal is worth $22, then corn is worth twenty-one cents per bushel, oats twelve cents, barley eighteen cents, and clover hay $6.08 per ton. Using these figures as a guide, a farmer would know if it would be profitable for him to sell his grain and buy mill feed. Of course, as I said before, he would have to take into consideration the distance of hauling grain and the freight on mill stuff.

The Breed of Cows.—In regard to the breed of cows, if a man wants to keep cows solely for dairy purposes, he should get one of the dairy breeds, such as Jersey, Guernsey, Holstein, Brown Swiss, Ayrshire, but in Iowa where we raise so much corn, we have to take into consideration the value of the calf, so we might say Iowa is practically the home of the dual purpose cow. The milking strain of the Shorthorn comes nearer the dual purpose cow than any other breed. Still, we have excellent results from other breeds.

Doing Good.—A man who brings a good sire into a neighborhood is not only benefiting his own herd, but is a benefit to the community. How prone we are to criticise our neighbors in all such matters. If a man buys a fine horse or builds a fine house, we wonder if he can afford such, forgetting that all these things help to increase the value of our own land. A good creamery in a community enhances the value of the land in that section. I was told by a land agent in South Dakota that land near the creamery was worth $5 per acre more than that a long distance from one. A wonderful lot of good could be accomplished if the creamerymen would visit the patrons frequently, giving information on the care and cheaper production of milk. Many of the patrons are sending milk to the creamery who have no knowledge of how susceptible milk is to the foul conditions of some of the barns. Some of the best patrons we have now at the college creamery were among the poorest when they first began to send milk. A lot depends on what manner we try to educate our patrons. We all like to be talked to kindly, the old as well as the young. In all my experience of over twenty years in dealing with patrons I have never found a case where it did not pay to use kindness. Frequently a few words which may not seem at the time to accomplish much, will have a lasting influence.

There is no good reason that I know of why Missouri should not become one of our leading dairy states.

SCRUB COWS AND SCRUB DAIRYMEN.

Prof. D. H. Otis, Manhattan, Kan.

A Scrub Cow Defined.—Considerable difference of opinion exists as to what constitutes a scrub cow. In the following discussion she will be considered as an animal of no particular breeding, representing a common average cow found upon an average Missouri or Kansas farm. She may have a little Shorthorn, possibly a little Holstein, or even a little Hereford or Angus blood in her veins, but this little infusion of improved blood is scarcely noticeable in performance, although it may at times be seen in the color of the animal.

Results at Kansas Experiment Station.—At the last year's meeting of this association I presented some results obtained at the Kansas Experiment Station with a herd of twenty-eight common or scrub cows. While the average Kansas cow was yielding ninety pounds of butter per annum this herd by good feed and good care was made to yield an average of 270 pounds of butter per annum. Considerable difference was noted in individuals. Four cows, or fourteen per cent of the herd, ran us in debt for their feed. Five of the least profitable cows, while they paid for their feed, brought in an income above cost of feed of only $6.35 per head. The most profitable five cows brought an income above cost of feed of $28.89, or 360 per cent more than the former. As far as dairy products are concerned one average cow of the most profitable five lacks only $2.86 of bringing in as much net cash as the whole five of the least profitable cows.

The experience of the Agricultural College has also been the experience of observing dairymen in various parts of the state. Mr. A. H. Diehl, Pearl, Kan., found from a year's record that his best cow produced 347 pounds of butter, while the average of the herd was only 240 pounds of butter, a difference of 107 pounds. With butter at fifteen cents per pound, Mr. Diehl's best cow brought $16 per annum more than the average of the herd.

Mr. E. S. Cowles, Sibley, Kansas, milks about twenty-five cows. For the month of March, 1900, he found that the average net profit from his whole herd was $2.80. The net profit from his poorest four

cows was fifty-five cents per head, while the net profit from his four best cows was $5.15 per head.

Mr. Chas. C. Lewis, Baldwin, Kansas, in a very carefully kept record found that his best cow produced 458 pounds of butter in twelve months and his poorest cow, 207, the average of the herd being 307. Not counting the value of the calf, the receipts for dairy products less the cost of the feed was $52.55 in case of the best cow, $30.11 for the average cow and $13.72 for the poorest cow. This means that the best cow is worth 74 per cent more than his average cow and 283 per cent more than his poorest cow.

This difference between individuals is undoubtedly greater in common or grade cows than in a herd of pure bloods that have been bred and selected along dairy lines for a series of years. The very fact that there is such a great difference shows the possibilities even with scrub cows. This brings us very naturally and unavoidably to a discussion of the

Scrub Dairyman.—This particular individual is rather hard to define. I presume he does not exist in Missouri at all. He is always associated with scrub cows, although the latter are not necessarily associated with him. His qualities will doubtless be best understood by a discussion of some of his characteristics.

A Stingy Feeder.—The scrub dairyman attempts to be economical by feeding meager rations. He forgets that about 60 per cent of all the feed a cow will consume is needed to maintain the wear and tear on her system, and the profit comes from that eaten over and above this amount. Since the cow is selfish enough to take what she needs first, the man who feeds only 70 per cent can not expect over 10 per cent profit. This system of false economy is really the worse kind of extravagance. The experience of the Kansas Agricultural College is that under the same conditions, the most profitable cows eat the most. The best cow in the herd consumed $8.37 more feed than the poorest cow; the average of the most profitable five cows consumed $4.09 more per head than the average of the least profitable of the five cows.

An Unbeliever in Balanced Rations.—The term "balanced ration" is a mysterious something that the scrub dairyman knows nothing about. He sometimes asks what kind of a chemical compound is it? One of our Kansas dairymen made a statement a short time ago that he took no stock in balanced rations. "Corn is the best feed I know of," says

he. When asked what roughness he fed with corn he replied "alfalfa." It so happens that corn and alfalfa make a balanced ration, but this scrub dairyman did not know it. Surely we can not expect a cow to manufacture a good quantity of milk unless we supply her with the right kind of raw material from which to manufacture that milk. The farmer who has employed a carpenter to build him a barn would be foolish to go to town and knowingly bring home all the lumber that was needed to construct the barn, but only half enough nails. After the carpenter had used up the nails he would have to cease work until he was furnished with a new supply. No less foolish is the man who employs a cow to manufacture milk and furnishes her with a great abundance, or even an excess of part of the elements needed for its manufacture, but supplies her with only half of the absolutely essential element, namely, protein, without which she can not possibly transform all the other elements into milk. This subject, protein, is doubtless familiar to all in attendance at this meeting, and I need not linger here to discuss it further. The question that confronts us now is what can we grow on the farm to supply the protein and not be obliged to buy high-priced concentrates. Last year we discussed the subject of alfalfa, and no doubt this is the best roughness where it can be grown, and of late years many of our Kansas farmers have succeeded in growing it where heretofore it has been considered a failure. But where alfalfa is not available the following rations indicate what may be grown to furnish the desired protein and what amounts are needed for a daily ration for an average cow.

1. Twenty-five pounds of red clover, with eight to ten pounds of grain, composed of one part corn and three parts oats.

2. Twenty-five pounds of red clover with eight to ten pounds of grain, composed of six parts corn and one part soy beans.

3. Twenty pounds of red clover and timothy, with ten pounds of grain, composed of seven parts oats and three parts soy beans.

Where oats and soy beans are not available and it is desired to substitute mill feeds, a grain ration of three parts bran and one part corn chop may be fed with red clover and a mixture of one part bran, two parts corn chop and two parts oil meal may be used with red clover and timothy. While the above rations do not begin to cover all the possible combinations, they probably meet most of the conditions existing on most of the farms in Missouri and eastern Kansas.

Some People Believe in Feeding Butter Fat Into Milk, in spite of the fact that many careful experiments, including the feeding of nearly pure fat to cows, have repeatedly shown that the test of a cow is an individuality of the animal and is not permanently affected by feed. Any change of feed or surroundings may cause a temporary fluctuation in the per cent of fat, and in so far as a feed may cause a cow to go dry it may have a direct influence in increasing the per cent of fat, since cows give considerably richer milk near the close of the lactation period.

The following inquiry from an Iowa correspondent is a sample of what many Kansas farmers are asking and concerning which there is considerable dispute. This correspondent says: "Did you in your experiment settle the oft-disputed question as to whether the milk of well-fed cows is richer than the starved animals seen standing on the north side of a barb wire fence with the wind blowing and the thermometer below zero?" Unfortunately we do not have a test of our cows previous to their arrival at the college, and we can not therefore tell just what influence a barb wire exerted on the composition of the milk, but we do know of their performance since their arrival at college. Our monthly records show that outside of variations due to shipping and increasing lactation period the tests of the first month were practically the same as the months that followed. The next question that is asked and which is doubtless implied in the above inquiry, is whether a whole year of good feeding would in any way affect the cow so that she would give richer milk the second year. A number of cows in the college herd, being rather poor individuals, were sold before completing their second year's record, but there are ten cows that have gone far enough on their second year's record so that we can make a comparison. The following table gives the results of these ten cows for corresponding portions of the lactation period:

No. of Cow.	Test in 1898.	Test in 1899	Difference.
No. 23	4.74	4.82	.08
No. 5	3.69	3.69	.00
No. 11	5.04	4.6	-.43
No. 33	3.60	3.58	-.2
No. 9	4.03	4.11	.08
No. 20	3.71	3.75	.04
No. 7	4.12	4.00	-.12
No. 24	3.23	3.27	.04
No. 6	3.98	3.66	-.32
No. 30	4.00	3.90	-.10
			-.075

From this table it will be noticed that there are four cows that gained in the per cent of butterfat; one cow has exactly the same per cent in both years, and five actually lost in the per cent of butter fat. The average result shows a loss of seventy-five one thousandths of one per cent. Out of these ten cows there were four that calved about the same month in each year; two of these four gained in the percentage of butter fat and the other two lost, the average showing neither a loss nor gain. Five of the ten cows began their lactation period from three to six months later in the second year than the first; two out of the five gained in the percentage of butter fat and three lost.

While the percentage of butter fat of these ten cows decreased .075 of one per cent the total yield of butter fat increased over 30 per cent. From these figures will be seen that feed had very little to do in changing the percentage of butter fat, but it did have a very marked influence upon the total yield of butter fat.

Perhaps the most radical change in feed is in the spring when the cows are suddenly changed on to pasture, and farmers frequently ask if this change does not lower the test. On May 10, 1899, the herd of scrub cows belonging to the Kansas Agricultural College was divided into two lots, one-half being put on pasture and the other half on soiling crops. For one week (fourteen milkings) previous and for one week after this date a butter fat test was made of each milking of each cow.

The following table gives a two weeks' summary of the cows on pasture:

Effects of pasture on the yield of milk and per cent of butter fat:

ONE WEEK BEFORE PASTURING.

Cow.	Milk.	Test.
No. 5	174.1	3.94
No. 9	56.5	5.13
No. 10	60.9	3.33
No. 12	69.5	4.77
No. 14	89.1	4.12
No. 22	85.5	4.14
No. 23	160.2	3.99
No. 25	210.0	3.81
No. 27	137.0	3.40
No. 28	158.1	4.28
No. 33	227.8	3.46
Average	.....	3.92

ONE WEEK AFTER PASTURING.

Cow.	Milk.	Test.
No. 5	160.	3.65
No. 9	66.7	5.6
No. 10	63.9	3.8
No. 12	73.	5.06
No. 14	90.2	4.26
No. 22	110.9	4.08
No. 23	159.2	4.15
No. 25	210.9	4.03
No. 27	145.4	3.84
No. 28	156.9	4.37
No. 33	226.4	3.83
Average	.....	4.10

DIFFERENCE.

Cow.	Milk.	Test.
No. 5	-14.1	-.29
No. 9	10.2	-.07
No. 10	3.	.47
No. 12	3.5	.29
No. 14	1.1	.14
No. 22	25.4	-.06
No. 23	-1.	.16
No. 25	.9	.22
No. 27	8.4	.44
No. 28	-1.2	.09
No. 33	-1.4	.36
Average	3.16	.18

In all cases the test for the week is obtained by dividing the total yield of fat by the total weight of the milk. It will be noticed that seven cows gained in the yield of milk while four lost, the average being a weekly gain of 3.16 pounds per cow. Eight cows of eleven gained in the per cent of butter fat, the average being a gain of eighteen one hundredths of one per cent. It is also interesting to note that one cow lost both in yield and test, while three others lost in yield but gained in test. In the latter case, the higher test caused each of the three cows to yield more butter fat the second week than the first. The two cows gained in yield but lost in test, the increasing yield being sufficient to cause an increase in yield of butter fat. There were five cows that gained both in yield and in test. During the same period we carried on a similar experiment with the soiling cows, the results of which are shown in the following table:

Effect of soiling on the yield of milk and per cent of butter fat:

ONE WEEK BEFORE SOILING.

Cow.	Milk.	Test
No. 1	111.4	4.59
No. 3	185.9	3.38
No. 4	74.2	3.63
No. 6	192.5	3.47
No. 7	225.7	3.97
No. 8	50.4	4.43
No. 11	169.8	4.62
No. 24	233.6	2.97
No. 26	154.9	4.12
No. 29	47.6	4.54
Average	.....	3.80

ONE WEEK AFTER SOILING.

Cow.	Milk.	Test.
No. 1	115.3	4.47
No. 3	178.4	3.45
No. 4	64.4	3.69
No. 6	187.4	3.42
No. 7	208.1	4.22
No. 8	47.3	4.55
No. 11	168.6	4.71
No. 24	238.7	3.09
No. 26	147.2	4.19
No. 29	49.3	4.42
Average	.....	3.89

DIFFERENCE.

Cow.	Milk.	Test.
No. 1	3.9	-.04
No. 3	-7.5	.07
No. 4	-9.8	.06
No. 6	-5.1	-.05
No. 7	-17.6	.25
No. 8	-3.1	.12
No. 11	-1.2	.09
No. 24	5.1	.12
No. 26	-7.7	.07
No. 29	1.7	-.12
Average	4.2	.09

From this table it will be seen that the soiling cows did not yield as well as those on pasture. This is what might be expected in early spring while the grass is green and succulent. Only three cows out of ten gained in the yield, the average result being a weekly loss of 4.2 lbs. per cow. Seven cows gained in the per cent of butter fat, the average result being a gain of .09 of one per cent. As in the pasture lot, one cow lost in yield and test, six lost in yield and gained in test. Of the latter, two gained in yield of butter fat, while four lost. Of the three

that gained in yield, one gained in test while two lost, but all gained a little in butter fat.

It should be noticed that the cows in this experiment were well fed during the winter, and the increase in yield due to turning on pasture was very small, and in the case of soiling cows the yield was actually decreased. The result of the experiment indicates that when cows are kept under good winter conditions there is no increase in test due to pasture.

Test vs. Profits.—A common notion among scrub dairymen that comes to light when making Farmers' Institute rounds is that the profit depends upon the test, and if one patron has a higher test than his neighbor then it must be that he is getting more out of his cows. Likewise if one cow has a test of 3.5 and another 4.9, then the conclusion is drawn that the 4.9 cow is by far the better cow.

In regard to the high and low testing of cows we must bear in mind that the test is only one factor in the equation. Frequently more depends upon the pounds of milk than upon the test. Take for example two cows at the Kansas Agricultural College. Cow No. 20, during her first year's record, yielded 9,116 pounds of milk in twelve months, which tested an average of 4.2. Cow No. 11 yielded 3,475 pounds of milk in the same length of time with a test of 5.1. A number of farmers when seeing the test of these two cows, have expressed themselves to the effect that cow No. 11 was an excellent cow because she had a test of 5.1. What are the facts in this case? No. 20, with a 4.2 test, produced for a year 383 pounds butter fat, and No. 11, with a 5.1 test, produced only 178 pounds butter fat, a difference of 205 pounds in favor of the lower testing cow. No. 20 brought us an income of $40.37 above the cost of feed, while No. 11 brought us only $7.60 over cost of feed.

A high grade testing cow may be a very poor cow financially. The same holds true in regard to different herds, and yet we find case after case where a patron receives his monthly statement and looks only to his test. If that is low then he concludes that there is no money in the dairy business. Once in a while we hear a man ask why his check is so large while his test is so low.

This kind of ignorance is not due to the absence of brains, but to the failure of the owner to exercise them. If a man is too lazy to think he must expect to have things look mysterious and unexplainable. Many

of the problems that mystify us to-day are the result of mental inactivity, the lack of energy, vim, push, and the determination to learn. In other words, it is a lack of gumption.

The experience of the Agricultural College, together with that of dairymen who keep records of individual cows, leads us to the conclusion that it is neither the highest nor necessarily the lowest cow that is the most profitable, but it is the one with an average test that gives a large flow of milk.

Makes a Poor Quality of Butter.—Doubtless the storekeeper is in a place to judge the characteristics of a scrub dairyman when the latter brings in his country butter. In order to ascertain the amount and character of the country butter sold in Manhattan (population, 3,600, plus 1,000 students for three-fourths of the year), six grocery firms were interviewed. Country butter amounted to about 75 per cent of the total sales. This was usually divided into four grades. The average results show 33 per cent of the amount received in grade No. 1 (the best grade), 23 per cent in grade No. 2, 17 per cent in grade No. 3, and 27 per cent in grade No. 4. On an average 20 per cent of the amount of country butter received was unfit for local sale and had to be relegated to the renovating factories. One of these firms stated that with a little more reading and studying on the part of the farmers there is no reason why 50 per cent of the butter that comes under grades No. 3 and No. 4 should not come under grades No. 1 and No. 2. This throwing of eight and ten-cent butter on the market, even though the storekeepers do take it at a loss to themselves in order to hold the butter market trade for groceries, etc., not only indicates a scrub dairyman, but it is a great damage both to the butter consumer and to the dairy interests of the state. Of course every farmer's wife makes the best butter, but somehow or other the quality "best" disappears after it gets out of the hands of its maker. "Whatever is worth doing at all is worth doing well," should be the motto of every private buttermaker.

Can't Raise Good Calves on Skimmilk.—A dairyman's herd of skim-milk calves is a very good index as to the character of the man. Experience of both experiment stations and up-to-date dairy farmers shows that calves fed warm, sweet skimmilk, in clean buckets, with access to corn or Kaffir corn meal, bright hay, fresh clean water, salt, plenty of sunlight, shelter and bedding in cold weather, shade in summer, regu-

larity, thoughtfulness and kindness in treatment, will usually be thrifty and gain from 1 1-2 pounds to 2 pounds daily. The dairyman who is unable to do this is behind the times and usually behind in his accounts. In other words, he is a scrub dairyman.

Evolution of the Scrub Dairyman.—In this day of cheap literature, of dairy conventions, of farmers' institutes, and of state dairy schools, there is no excuse for a man remaining a scrub dairyman. If he will, he can evolute into a dairy expert. He may have to use scrub cows at first, but they will simply be a means to an end. By constant selection and grading up it will not be long until his herd of scrub cows will evolute into a high grade of choice cows concerning whose profitableness there can be no question. He will realize that life is too short to grade up a herd of common cows with a common sire, and to use anything short of a first-class, yea, even a pure blood animal, of good milking strain, is a crime against his own welfare. The world moves and the dairy industry moves with it. If we are to be anything but scrub dairymen we must be ready to benefit ourselves from the experiences of others, whether those experiences be received orally or through the medium of papers and books. We must also not be so deep in any one rut that we can not change our methods whenever such change will bring financial gain.

THE POETRY OF BUTTER-MAKING.

MRS. GEO. E. DUGAN, Sedalia, Mo.

The drowsy sun is sinking to his rest,
The Clover blossom nods beneath a weight of dew;
Long waves of red are flaming from the west,
The meadow bars are down and cattle coming thro'.
Co-Boss! Co-Boss! a barefoot maid is calling,
Co-Boss! Co-Boss! old Brindle always strays—
Co-Boss! Co-Boss! the shades of eve are falling,
And milking must be done while yet the daylight stays.

We live best when we live in our ideals. The patient plodder on low ground may be a most excellent creature materially, but he should sometimes climb to the heights for a broader outlook. There is better atmosphere near the summit of human experience, and it is not healthful to always stay on marshy ground.

There is a poetical—as well as a practical side to almost every kind of toil, only some people refuse to recognize the poetry, believing that the sole aim of existence is to be severely practical. The wings of the soul must be clipped until the soul can no longer soar, but must tramp drearily through the mud and dust of a barren existence. Yet it is the soul which plans, progresses, toils, suffers, soars, or sinks according to the way man orders his life. The spiritual, which is the poetical side of the individual, has its needs, more than does the material part, yet the soul is so often crowded and dwarfed by material conditions that it seems to wither away, like a neglected plant. Poetry is not impractical, it is always the beautiful which soonest captures and longest holds our attention. There is beauty in rugged strength; the grandeur of lofty mountains inspires awe, and tends to reverence, but it is the simple beauty of the fragrant meadow lands, where the scented clover nods its dainty head to the sleek, sweet breathing kine, which touches life at its heart, making man feel sure that this world is a good place and all things here wisely ordered by a beneficent Creator.

Familiarity with these lovely rural scenes sometimes makes man nonappreciative of their value, and then these peaceful pretty pastorals are to him only the dullest prose.

This is the age of mammon, and life itself seems often to be regarded as so much gross material to be coined into money. For the individual who takes this sordid view of human existence the Creator has wrought in vain. The gorgeous crimson and royal purple of the sunset, the lakes of fire, the rivers of gold, the emerald mountains, the vast opal oceans, with all the marvelous and indescribable shadings of these glorious sky pictures, are to the spiritually blind, merely portents of a coming storm. The sweet penetrating perfume of the new-mown clover is only considered from a commercial standpoint, for almost all the meaning left to existence seems to be bound up in a hopeless struggle for dollars. The spirit of man, the real, living ego, all of him that has the smallest hope of immortal joys, is often neglected and dwarfed until I fear that even the All-seeing eye must search to find him. Yet "what shall it profit a man if he gain the whole world and lose his own soul?"

Life—to reach the heights—must be lived unselfishly. Toil—to bless mankind must have a high motive. Every effort—in whatever

direction—that has for its chief aim the improvement of human conditions, or the general uplifting of society, will eventually bless and ennoble the toiler, as all such effort must be approved by the Supreme Master. Whatever work is done should always be done in the best manner possible; slovenly methods will neither help him who toils, nor aid his brother. Emile Souvestre, "the Attic Philosopher," says: "I hate the look of disorder, because it shows either a contempt for details, or an unaptness for spiritual life. I distrust both the intellect and the morality of those people who can live at ease in an Augean stable."

There must be no Augean stable in the vicinity of the butter-maker, everything about this work must be as pure as the lily and as sweet as the rose. Who that has dwelt in one of the eastern states in the days of long ago, does not remember the cleanliness and sweetness of the old time milk house, where a stream of crystal water ran through among the flat stones on which in stately rows sat the shining milk pans with cream half an inch thick, tempting the epicure to deeds of vandalism?

There is a little poem which so perfectly describes one of these places that I will quote a few stanzas to prove that poetry and butter making are near enough akin to be joined in complete harmony.

"At the foot of the hill the milk-house stands,
Where the Balm of Gilead spreads his hands;
And the willow trails at each pendant tip
The lazy lash of a golden whip.
And an ice-cold spring with a tinkling sound,
Makes a bright green edge for a dark green ground.

Cool as a cave, is the air within;
Brave are the shelves of burnished tin.
Curving shores for the seas of white,
That turn to gold in a single night—
As if the disk of a winter moon
Should take the tint of a new doubloon."

There is more of the poem, but this will suffice to prove that there is analogy between poetry and butter-making.

A few years ago at the World's Fair in Chicago, a lady molded rolls of golden butter into forms so beautiful that many who saw the work sorrowed because it was perishable. That woman was only manifesting the poetry in her own soul, just as every woman does, in a greater or less degree, who churns the rich cream into golden globules of butter, and then presses and pats these globules into dainty rolls, or moulds them

into commercial forms to please the eye and distract the palate of her customers. To be poetic in butter-making every condition must favor the work. Stables and dairy houses must be absolutely clean, the milk fleckless, pails and pans spotless, and the garments of the milker free from contaminating odor, his hands immaculate, and the udder of the cow as clean as a fresh washed human face. In this way only can the poetry of butter-making survive.

There is just as much difference between pure sweet butter and the conglomerate grease, miscalled "butter," as there is between the sublimest poetry, and the crudest prose. When I pass a farm house and see rows of shining milk pans and pails, reflecting the glad sunshine, I am sure that here dwells a soul capable of appreciating all the subtle refinements of good and wholesome living.

Somewhere in the vicinity of Lamonte, Missouri, there is a lady who is truly a poetical butter-maker. One grocery firm in Sedalia handles all the butter she sends to market, and people almost elbow each other to get it at twenty-five cents a pound. A connoisseur who lives in Ohio was recently our guest; when he tasted this butter he exclaimed: "My, you have excellent butter; I did not suppose such butter could be made in Missouri." As if all things good and great were not possible to this superlative inland empire.

Ah, the fragrance of this sweet golden butter! It combines the subtle perfume of red clover, with the scent of other rich meadow grasses, and when the lid is lifted from the box in which it is shipped its delicious aroma delicately pervades the whole store.

A writer in the "Globe-Democrat" of St. Louis said a few days ago: "The indefinable flavor of the genuine, matchless product of the living cow can never be imitated, let druggists, inventors and chemists struggle with tallow as they will. Those who can not tell the difference are welcome to their gustatorial deficiency, it is their misfortune. They furnish a channel for working off the stale oysters and bad eggs." He further says—most pertinently: "With such a country as we have here, and still expanding, it is a shame to our civilization to have to eat the imitation of anything." I hope for the coming time when our kitchens shall be laboratories, where science will join hands with feminine intelligence, until our tables shall feel only the weight of pure healthful food, and bogus supplies will have to apply for recognition to less civilized and less intelligent people.

Charles Dudley Warner made one of his heroines say that "there is no poetry in kitchen work," that no artist ever lived who could idealize a cook. He says: "No cook is picturesque." Well, what of that? Are there not better things in life than those embodied in the word "picturesque?" The cook may put so much good heart, bright brain and unselfish motive into her work that it will shine with the lustre of genuine poetry.

There may be grace, neatness, cheerfulness, such a wholesome desire to live unselfishly, that the kitchen department may be the best one in the whole house. The dairy maid may always be picturesque; she must --indeed—be the embodiment of neatness and the very quality of her work gives her a grace not readily acquired in other occupations. I have in memory the picture of a fair young girl standing beneath a vine embowered porch, churning. The churn was of the old, old sort, with an up and down dasher, the kind that our modern maidens abominate. The girl of my story had blue eyes, rosy cheeks and a wealth of sunny hair which was neatly braided and tied with blue ribbons. Her dress was a simple blue print, but it was so fresh, so charmingly clean, that I almost regretted the dainty white apron she wore over it, with a bib coming up to her chin. Her beautiful arms were bare to the elbow, and they were strong, firm, well molded arms, such as typify strength coupled with daintiest grace. The rythmic sway of her supple young body as she bent back and forth to dash the rich cream into golden butter, made me wish for the skill of an artist that I might perpetuate the scene by placing it on canvas. How I longed for a quaff of the rich buttermilk soon to be forthcoming—pure and cool from that old cedar churn, but I had to content myself with a smile from the sweet red lips, a bend of the sunny head, and a flash of light from the beautiful eyes, and go on my way carrying the picture for many long years, a memory like the vision one sometimes has of angels when one dreams.

Far up in the Pocantico hills in Westchester county, New York, a millionaire with a soul full of poetry has established Briar Cliff farms for dairy experiments. This venture is under the supervision of Mr. Law, who gives his personal attention to every detail of the work. It is said that this experiment is a fulfillment of the life dream of Secretary Wilson, a practical school of scientific dairying. The books on this farm are kept as carefully as are those of any business firm, and Mr. Law has

demonstrated that it is not alone capital which insures success, but rather getting all there is to be had from every opportunity.

Among some of the rules from which there is no appeal, are gentleness with the cows, perfect cleanliness in barns and dairy houses, earnest interest from each employee and the absolute freedom from disease of each man or woman who comes in contact with the cows, or manipulates the milk and butter. The cows are examined twice a year by an expert veterinarian to detect signs of disease in its incipiency, and on these farms no cow is allowed to become a mother until she has ceased to be a calf. The youngest mother among Briar Cliff cows is two years and ten months old.

Mr. Law insists upon good diet for his cows, and will have in his employ only the most careful and conscientious help. Good homes are provided for the employees, the single men clubbing in a large building, while those having families are provided with neat and comfortable cottage homes. A good library and large reading room are among the conveniences the help find at Briar Cliff farms. Mr. Law seems to be exemplifying the poetry of butter making in folio style. Let me conclude this essay with a few verses from another delightful pastoral poem:

"Beside the churn the maiden stands,
With nimble naked arms and hands;
Another Ruth when the reapers reap,
Her dress as limp as a flag asleep—
Is faced in front with a puzzling check.
Her feet are bare as her sunbrowned neck,
Her hair rays out like a lady fern,
With a single hand she starts the churn.
The play at first is free and swift,
Then she gives both hands to the plunge and lift.
A short, quick splash in the milky way—
One, two, one, two in iambic play;
A one-legged dance in a wooden clog,
Dancing a jig in a watery bog.
A sober gait, in an all-day jog,
Up, down; up, down, like a pony's feet,
A steady trot in a sloppy street.
The spattering dash in a tinkling wash,
Deaden and dull to a creamy swash.
Color of daffodil shows in the churn,
Glimpses of Gold. Beginning to turn.
Slower and slower—deader and dumb,
Daisies and daffodils, butter has come."

SILOS AND ENSILAGE.

EUCLID N. COBB, Monmouth, Ill.

Who among the dairymen present is not conscious of the abundant flow of milk that follows turning his cows on the fresh, green grass in the springtime? Who of you has not wished for this to continue throughout the growing season? And when a year does come that is so seasonable that the pastures are good throughout the summer, what records the cows make; what a nice amount of cash comes from the sale of milk, cream or butter; how well the cows look; what growth the young stock make. Who among you would not like to be assured that such seasons would be continuous, or, better still continue through the winter as well as summer months?

I am here to-day to tell you how to have no break in the succulent foods furnished by the green grasses. If the environments of the cows are the same as when they are on pasture, better results will be obtained even than grass gives. This succulence spoken of can be found in ensilage.

What is Succulence—It is found in the apple and not found in the dried fruit; it is found in our canned fruits but not in the same fruit when evaporated; it is found in a freshly cut slice of bread to a greater extent than in a slice that has been exposed to the air for a time; it is in the green stalk of corn at its fullest development; and this put into the silo where all of the rich, appetizing properties of the plant are preserved for an indefinite period, furnishes a succulent food for our cows to feast upon when mother earth is locked in the icy fetters of winter or is parched and withered during the long hot summer days. As I before stated, if the environments are the same when our cows are being fed ensilage, they will do better than when running on the average pasture. They must have clean, warm quarters, their water should be abundant and at a temperature that will insure their taking the amount necessary for their requirements and there should be plenty of sunlight in the stables. If we are feeding ensilage during summer months, the fly plague should be checked. The cows should be confined in cool, airy barns, or better still, fed in a grove.

Balancing Ensilage.—What shall we feed with ensilage? The chemist tells us that in good corn silage we have plenty of carbohydrates, but there is a lack of protein, so we must feed some substance rich in that material. I find we can buy a pound of protein in cottonseed meal cheaper than in any other food product, so we use a reasonable amount of this, which is three or four pounds; but as this is very condensed in form we must have still another feed rich in protein, but light and bulky, like ground oats, bran or dried brewer's grains. We use the latter because the protein content costs us less per pound than in the other named feeds. This method feeding is necessary, and any radical deviation from it will cause a loss of milk and a corresponding gain in flesh. Hence, feeders of beef cattle can learn a lesson at this point.

What advantages has ensilage over hay and fodder? First, ensilage is from six to ten times heavier per cubic foot than dry fodders and hay, which enables us to store a greater tonnage in a given space than we can of the more bulky material. We also get that tonnage very close to our cows' mouths thus saving a great amount of labor in feeding. It is the only form into which we can put our corn and have it all eaten—practically there is no waste. We have learned by experience as well as from the experience of other dairymen and from our experiment stations that in no other form excepting perhaps the green stage, will our corn crops yield us so great returns in milk and butter as well as beef and pork, and I may add poultry and eggs, for we deem ensilage one of our necessary poultry foods.

The Silo.—We will now turn our attention to the silo and its construction. It is conceded by the best authorities that the round form of silo is the best shape in which to construct, because of its strength, cost of building and better preservation of contents.

The material best adapted for this style of a silo is 2x4 stuff; buy the dryest you can get and of the length required. Take it home and treat it to a heavy coat of coal tar. To do this lay the stuff down on a level place close together; then apply the tar with a whitewash brush and let lie a day or two. Then turn up another face of the lumber and give that a coat of tar, and so on until all sides have been thus dressed. Coal tar is superior to any of the paints for preserving silo lumber.

For a Foundation, lay off the circle required with a fence board that

is half as long as the diameter of the silo. Put a peg at the center of ground where the silo is to stand, bore a hole in one end of the board large enough to slip over the peg. By swinging the board around the peg, a circle can be laid off. The outside circle should be ten inches outside of wall of silo. Dig foundation ditch eighteen or twenty inches deep, then fill up with small rocks, brick bats or coarse gravel. Over this pour thin cement till the ditch is full. It is then well to build up a wall eight or ten inches above the level of the ground, with rock or brick. For a sill take ten-inch lumber one inch thick, cut in segments of a circle; lay first course down in cement or mortar, coal tar the upper side and lay on another course, breaking joints and nail through both boards. Lay on another course and tar as before, then another course, making a sill four inches thick.

Now you are ready to build. First lay off the circle, and divide into four parts. Stand a 4x6 hardwood stick on sill flush with inside of wall (use a 6x6 pine if hardwood can not be secured), toe nail securely then brace the stick well from all points except inside of silo circle. Now measure off another one quarter of sill and stand up another timber, and so until four are standing.

After the four timbers are set in place and braced, take two by fours and set one out about three feet from each timber, fasten them together with staying boards in two or three places and as high as the silo may require, and also tie them to the 4x6 timbers. These pieces should be about six or seven feet apart, one within four feet of the top of the silo when completed.

Ready to Build.—We are now ready to go ahead with the construction of the silo. Have one man on the top of scaffold, one in middle and one on the ground, each with a heavy hammer and some sixty-penny spikes (wire). Set up a 2x4 edgewise against the 4x6 piece and spike through it into the 4x6 in five or six places. This will secure each piece as set, which relieves one of the necessity of using the hoops till the silo is finished. It also greatly strengthens the silo and keeps it from sagging or spreading in hot, dry weather, when the silo is empty. In case the builder is renting the land, he can spike together four or six of the two by fours, and omit nailing one, then again nail. This will greatly facilitate removing the silo and setting it up again if one wishes to move at any time.

The roof can be of boards or shingles, as one may desire. The bottom should be mother earth; it is far superior to cement or any other material. The hoops can be put on any time. They may be $\frac{5}{8}$-iron or even $\frac{1}{4}$-inch rods will answer. We have on a twenty-five foot silo only $\frac{1}{4}$-inch rods, and never have had any give way. The 4x6 timbers answer for take-ups for these hoops. The timbers have holes bored in them for the hoops, and these are each in four pieces, and reach through the timbers five or six inches with an eight or ten-inch thread cut on them so that there will be plenty of room to take up any slack that may be caused by staves drying out. Some may wish to use lugs for taking up the shrinkage. They can do so by letting hoops pass by the timbers two or three feet. If lugs are used one can use 2x8 pieces in place of the 4x6 pieces, set edgewise, inside edge flush with inside wall of silo. Holes are bored in these for the hoops, as in the other case. These pieces are to hold up the hoops and make something to start from when beginning to build silo.

Filling the Silo.—We now have our silo built, and the next thing is to fill it. The machinery necessary is a cutter and carrier. Be sure to order a large size machine, for two reasons.

First, a large cutter has a heavier frame, heavier castings, and is better constructed throughout than are the lighter machines.

Second, with a large machine one has capacity to handle the crop rapidly if necessary, and I have found that rapid work is the cheapest, even if the daily expense is greater. One gets through quicker, and every one does his best when he sees the chips fly lively.

The power should be steam if possible. At the time of year when ensilage cutting comes on, one can usually hire a threshing engine, as the threshing season is then about over.

For moving the ensilage crop from the field, low down wagons with flat racks are best.

The corn should be cut with a corn binder if possible; it saves nearly fifty per cent in cost of putting up the crop. If one can not be procured, use as the next best thing a sled cutter, and if one of these is not to be had, use the old reliable, good-enough-for-our-fathers corn knife.

In filling silo keep the outside of silo three or four feet higher than middle at all times. Tramp around silo walls often; it is not necessary

to tramp anywhere else. Hang on the end of the carrier a funnel two feet and six inches in diameter at the top and ten inches at the lower end. At the lower end have some hoops on which to hang a sack funnel made of bran sacks sewed together, enough to reach the bottom of the silo. One man leads this around and puts the ensilage just where he wants it.

When the silo is full and well rounded-up in center, run up some oat straw and spread this over the silage five or six inches deep; wet it well and you are through.

CHEESE MAKING ON THE FARM.

W. A. Stevens, Garden City, Mo.

I am pleased to see our great State of Missouri coming so well to the front in the dairy industry and I see no reason why we should not keep right on till we take front rank as a dairy state. Our natural advantages of soil, climate and geographical situation should put us in the lead.

The time is fast coming when we must change our mode of farming, and what is more natural than the development of butter making—by the establishment of creameries as butter is universally made and used on the farm, and creameries are the natural sequence of growth. Cheese making seems to be considered secondary to butter-making here in the west. While in reality it should take equal if not superior rank in point of profit and economy; for while we obtain four to six pounds of butter, worth 12 to 15 cents a pound, from 100 pounds of milk, we get from nine to eleven pounds of cheese, worth from 9 to 11 cents a pound and the expense of building and operating a creamery is far in excess of that of a cheese factory. Skim-milk is rated as worth 10 to 15 cents a hundred for pig feed but it is worth too much as human food to be used in that way.

I consider cheese making on the farm as a necessary preliminary to the establishment of the factory system as the farmers of our state can in no other way so easily be educated up to the profits and advantages of the business. Away back in the forties, before factories were heard of

on the "Western Reserve" in Ohio a large proportion of farmers were making cheese, each working up his own milk. At that time the cheese had to be hauled on wagons to the Ohio river and shipped by boat to New Orleans and other points for a market. Soon after the advent of railroads, factories began to appear. The business had grown to such an extent that in 1872 when we left there there were five well supported factories in the township in which we lived. Now if the industry could develop to such an extent under those circumstances, what may we not do, situated as we are at the distributing center of the United States with a good market in any direction we may turn right at our door?

The business of cheese-making must of necessity be of slow growth, as most farmers must be given practical illustration of the advantages before they will take hold of it. I do not advocate the plan of each farmer working up his own milk but let it be done by small farm or neighborhood factories. The first cost of these need not exceed $50 for an outfit to work up 1,000 pounds of milk, aside from a building to work in. Approximately the amount of milk that will make a pound of butter will make two and a half pounds of cheese, and by taking the relative prices of each anyone can easily find which will be the more profitable for them. One person can do all the work of making and curing and this need not take all of his time. Our plan is to make and cure for one-fifth, each patron marketing his own cheese, which can usually be done at near by towns. We make a cheese to weigh about ten pounds and most of them are sold to the consumer whole. It takes a little more work to make a small cheese but it cures out more quickly and we get them off our hands sooner. We find most of our country customers, at least, prefer them at three to four weeks old, and will use ten to one more than of the factory make, such as we usually get.

Now as to comparative profits on our own milk; the present year our milk has gone to the creamery for the months considered best for butter profits, say from January 1 to May 20 and from November 1 on. By consulting our check stubs, we find the milk sent to creamery averaged fifty-two and one-half cents per hundred, after paying ten cents for hauling; while for the five months of cheese making it was seventy-six cents after allowing one-fifth for making. We worked up 139,000 pounds of milk in the five months, making 12,640 pounds of cheese, about 11 pounds of milk to the pound of cheese.

Another farm factory about four miles from us reports receipts of 69,280 pounds of milk and 5, 354 pounds of cheese made. At this factory the work is done by two daughters who wished to make some pin money, they receiving the profits from working up the neighbors' milk. They have been working this way for several years and are well pleased. There are a great many families to whom such a plan would be of great benefit if they could just get started.

There are several books on cheese making on the market, the careful study of which will enable any one to make a fair article.

Of course it requires considerable practice to be able to make a good cheese every time. I have been making more or less for five or six years and can not do it yet. But everyone who starts out with the determination to succeed, and will study and give close attention to details, will come out all right. Every one who has brought milk to us one season is ready and anxious to bring the next. Every year brings new patrons, without solicitation on our part.

The demand for our cheese has increased very fast in the last two or three years. We had been patronizing the creamery for three years till last season, when, partly at the solicitation of neighbors and partly on our account, we started up cheese making again. We were a little afraid of the market and made but three days of the week, but toward the last of the season could not keep up with the demand by making every day. This season we doubled our capacity, working six days of the week and still could not keep up with orders. We sold at ten and eleven cents and might have gotten more, perhaps, but it was making us good money at that.

One advantage of the small factory is it takes most of the output to supply the home demand. The closer we can keep producer and consumer together, the better for both.

As to the cost of my outfit, my two hundred gallon self-heating vat cost sixty dollars. The presses are horizontal, made to press ten ten-pound cheese, home made at small cost, with common wooden bench screw costing twenty-five cents; hoops are galvanized iron made by tinner at thirty to fifty cents each; curd knives, home made of hoop iron. The curd mill we have never used, but think we will next season, as it is rather hard work stirring the curd of more than one thousand pounds of milk.

We have been investing our surplus in land as opportunity presented, but three years ago we concluded we had too much to look after, so sliced off a hundred acres, got a good man to take it, stocked it with cows and hogs, gave him half the cash proceeds. He has been doing well and we get good rent. Of course he is a patron of our factory.

In conclusion will say, if anyone will try cheese making on the farm, he surely will never go back to butter making, if he will stick to it till he gets a good trade established.

There has been an exceedingly encouraging growth in the production of cheese in Missouri and Kansas within the past year. Two years ago and even one year ago very little western cheese was handled on this market; to-day there are only one or two firms handling Eastern or Northern cheese and with these the amount is comparatively small and steadily decreasing. Missouri has made the best showing in this respect and the Northern half of the State is becoming an important cheese section. There are a good many new factories that have been established the past year or so, but the major part of the increase in volume of output has been from the enlarged make of the older factories. Kansas City is a good market for this western cheese and is supplied almost entirely from this source. The ruling price on this market of Western cheese averages about one cent under the quotations on Eastern and Northern offerings. Very frequently the quality is equal, but the average falls a little short, thus bringing the price down a trifle.—*Kansas City Packer.*

The Missouri Agricultural College.

The Missouri College of Agriculture is now such an important factor in developing the agricultural interests of the State, and its work is so imperfectly understood by many of our farmers, it is deemed wise to describe somewhat comprehensively in this report the character and scope of the instruction given there.

At no time during the history of the College has there been greater progress than during the past few years. Two principal reasons for this progress may be given:

First, through the efforts of investigators in the United States Department of Agriculture and the State Experiment Station the body of knowledge purely agricultural in character has been greatly enlarged. Instruction in this field can now be made more scientific, more practical and more complete in every respect.

Second, as the country grows older and the soil less productive, the farmers throughout the State are gradually becoming more appreciative of scientific methods. The College is less hampered by adverse public opinion than formerly. More than that, it is receiving strong support financially and otherwise from the rank and file of the farmers in this State, all of which is most gratifying to those who are active in its management.

While the Missouri College of Agriculture is a Department of the State University, it has a faculty of its own consisting of specialists in their respective lines of work. The students have free use of the University library and other advantages offered in a large University which are not to be found in a distinct and separate agricultural college.

The College itself is divided into departments, each of which is in charge of a head professor. The agriculture taught in the first year of the long course is limited to soils, fertilizers and farm crops. Since a knowledge of the soil and its properties is fundamental to agriculture,

considerable attention is given to this phase of the subject. The student is made familiar with the geological agencies which have brought about rock disintegration to form soils and such physical properties as influence crop production, as water capacity, solution of plant food, etc. Much stress is put upon proper methods of tillage.

The preservation and application of farmyard manures as well as the uses made of the various forms of commercial fertilizers receive due consideration. Preliminary to farm crops the student learns how plants in general derive their nourishment from the soil and air and how the various food constituents such as starch, albumen, etc., are elaborated in the plant. Cross and self-fertilization, germination, etc., are given the attention they deserve. The proper methods of growing and harvesting our leading farm crops are discussed during the latter part of the year.

Students Judging Live Stock.

Second year agriculture is confined to animal husbandry. The present status of the live-stock industry in America and the general adaptability of Missouri for this branch of farming certainly warrants the College in making this work a leading feature of the course. The work begins with the study of the history and characteristics of the breeds of live stock. Both the desirable and undesirable qualities of a breed are pointed out and comparisons made, one breed with another. In connection with the class-room work the students are given practical work in judging

farm animals. At the State Farm may be found specimens of the leading breeds of live stock. After the student becomes familiar with certain standards used in stock judging he is given work with the score card to test his judgment. By the use of the score card which is really a scale of points, the student makes a detailed study of the animal in question and marks, on the scale of one hundred for perfection, whatever, in his estimation the animal deserves. The card is signed by the student and handed to the instructor, after which the good and bad points of the animal are openly discussed. After becoming thoroughly familiar with the use of the score card, the student is given what is called competitive judging. Several animals of a given class are brought into the judging room and placed side by side, each distinguished by number. The student carefully examines each animal, makes his comparisons according to the score card and ranks them, first, second, third, etc., according to his own judgment. He writes his reasons for so ranking them and hands in his report. After the report made by each student is handed to the instructor, the latter makes the awards and explains his reasons for placing one animal ahead of another. The College endeavors to meet Missouri conditions by giving special attention to judging of beef cattle. No institution offers better examples in this respect. Besides the College breeding stock, and a large number of steers being fed for experimental purposes, there are on the farm during the winter months several herds of blooded stock from different parts of the country which are being inoculated for Texas fever preparatory to shipment south. There are also extensive feeding establishments near Columbia where may be found excellent specimens of both fat cattle and feeders. The work in stock judging is of great practical value to the young farmer since it trains his judgment and enables him to make wise selection when purchasing farm animals either for breeding stock or for feeding purposes. It also fits him for judging at fairs and stock shows when called upon to do so.

STOCK BREEDING.

The lectures on stock breeding cover such subjects as the laws of heredity, variation, selection, in-and-in-breeding, fecundity, atavism, etc., The great improvement that has been brought about in the different breeds has been accomplished by observing these principles. The stu-

dent is given practice in tracing pedigrees and is also made familiar with the use of herd books. This training is invaluable to the prospective breeder of blooded stock.

STOCK FEEDING.

In this work the student is made familiar with the composition and digestibility of various food-stuffs. He learns how they are prepared and fed to the best advantage, whether for beef or milk, mutton or wool. He is also given practice in compounding rations for the different classes of farm animals. He soon becomes familiar with such terms as protein, carbohydrates, balanced rations, etc., terms so often used in articles on feeding, and so confusing to the average reader of agricultural journals.

DAIRYING.

The College is just entering upon a new era in this important line of work. The last Legislature appropriated $40,000 for building and equipping a new Dairy School, and $5,000 to provide a Professor of Dairy Husbandry. This aid will probably give Missouri the largest and finest college dairy building in America, and it is expected to have the school ready for work in January, 1902. For the first time in the history of the institution, regular courses will be offered next winter in Creamery Management and Cheese Making, and experimental investigations in dairy problems will be inaugurated. A course in Farm Dairying will also be given to the students of the Short Course in Agriculture, as has been done during the past five years. The very best teachers which money can secure will be employed, and the work will include all the practical and scientific details of the industry. There is no division of agricultural practice where exact knowledge will pay better dividends than in dairying. Modern manufacturing methods require modern knowledge and training. The young men of Missouri will now have a splendid opportunity for training in work which is destined to increase largely with the advancing prosperity of the State.

The Courses of Study will consist of lectures on all the sciences related to dairying, given by college professors who are high class specialists in their various lines, and supplemented by daily practice in the

college creamery. The work will embrace the following topics:

Milk Testing.—Instruction and laboratory practice in modern methods of testing milk and all its products, by use of the Babcock test; detection of wastes in creamery practice, analysis of composite and individual samples: inspection of milk for adulteration, watering and skimming: calibration of glassware; Mann's and Farrington's acid tests, etc.

Separator Work.—Daily instruction and practice with at least six of the leading makes of cream separators, both steam turbine and belt machines: methods of heating and cooling in separation: receiving, sampling and weighing milk at the intake: care and management of the separator.

Buttermaking.—Practical instruction and work in the various methods of ripening cream, with use of acid test: churning with box and combined churns: working, salting and packing of butter by most approved methods: inspection and judging of butter samples in all conditions: use and preparation of starters, both commercial and home made: methods of preserving and shipping butter.

Cheese Making.—Instruction in the principles underlying the manufacture of cheese: daily practice in making of Cheddar cheese in large quantities: practice in the use of the rennet tests, both Monrad's and Marschall's: testing whey by lactometer and Babcock test: use of hot iron test for determining acid: milling, pressing, bandaging and curing cheese under various conditions: thorough drill in scoring and inspecting cheese. Instruction will probably be given in the making of Swiss cheese, Edam, Gouda and other fancy articles, if desired.

Dairy Chemistry.—Lectures on the elaboration, nature and composition of milk and other dairy products: conditions affecting creaming and churning: the changes occurring in cheese during making and ripening: theory of centrifugal separation, and construction of the different machines.

Dairy Bacteriology.—Thorough instruction on the relation of bacteria to dairying, including the nature and distribution of bacteria and conditions of growth: the proper care and treatment of milk: methods of avoiding and combating injurious bacteria: normal and abnormal fermentations in milk, butter and cheese: modern sanitary methods of handling and preserving milk and cream for market: propagation of flavors and starters.

Pasteurization.—Complete instruction on relation of milk supply to public health: the principles underlying methods of pasteurizing and sterilizing milk, and conditions essential in apparatus: methods of restoring viscosity in pasteurized products: practical work in pasteurizing milk and cream for market, for buttermaking, sterilizing skim milk, use of the various machines on the market, bottling, cleaning utensils, etc.

Creamery Management and Bookkeeping.—Exposition of various plans of operating creameries, from proprietary to co-operative: how to establish and build dairy plants: discussion of various plans and machinery: methods of keeping books and distributing dividends, with practice in the same: practical hints for creamery patrons.

Dairy Machinery.—Instruction and practice in the management and operation of engines and boilers: thorough drill in the care, setting and repairing of separators, churns, etc.: proper placing of shafting, belts and pipes: management of pumps and injectors, water supply and refrigerating systems.

Breeding and Selecting the Dairy Cow.—Lectures on the principles of breeding, including heredity, variation, crossing, etc.; history and development of the dairy breeds, with instruction in the special characteristics and utility of each breed: how to select the best dairy cow: the dairy type, general purpose cow, etc. Thorough drill in judging and scoring the college herd of Jerseys, and several large neighboring herds of Holsteins and Shorthorns.

Feeding the Dairy Cow.—The production of crops suitable for dairy farming: principles of nutrition and digestion: calculation of dairy rations, with estimates of cost: feeding for milk, applied to Missouri conditions: rearing of calves, etc.

Diseases of the Dairy Cow.—Instruction in elementary physiology of animals: treatment of common diseases of stock, and simple surgical operations: the construction of barns with reference to health of cattle, including ventilation, light, etc.

All the above topics are so intimately connected with dairy practice that no one who hopes to keep abreast of the times can afford to be without this knowledge and training. The college has for the past five years been giving condensed instruction in all these lines, except the creamery and cheese work on a large scale; but it is now expected to organize a separate dairy course where students may spend at least twelve

weeks in studying these matters alone. This work will also be given throughout the year to students in the regular four years' course in agriculture, and opportunity for graduate and special work along any line will be offered, according to the needs of the student. Worthy graduates will be assisted in securing any positions that may offer in practical work.

Prizes in Dairying.—The State Board of Agriculture offered this year a cash prize of $25 to the student making the highest scoring butter, and $15 as a second prize. The Creamery Package Mfg. Company offered $50 in prizes for best essays on Missouri's adaptability to dairying. Special prizes are also offered by several commission houses and manufacturers of dairy apparatus and supplies.

The law requires the Professor of Dairy Husbandry to act as a Dairy Commissioner for the State, to organize series of dairy meetings, institutes and conventions, to assist in establishing new factories, instructing patrons, and in every way possible aid in promoting the dairy industry of the State. Missouri, with its splendid herds, rich pastures, abundant forage crops, excellent railroad facilities and good markets, is certainly an ideal State for dairying.

It is earnestly hoped that the farmers of the State will support the new dairy school, and develop this work until Missouri shall stand at the front in dairying, as she already does in fruit raising and beef production.

AGRICULTURAL CHEMISTRY.

During the third year agricultural chemistry is taught throughout the year. Since this subject is applications of chemistry to farming, it must necessarily follow the course in general chemistry. The work deals with the chemistry of soils, fertilizers, plant growth, food stuffs and their adulteration.

VETERINARY SCIENCE.

The first work in Veterinary Science is given during the third year of the course. It consists of lectures on the anatomy of farm animals illustrated by charts, models and prepared specimens. The students have

laboratory work in dissection in connection with their class work. During the fourth year, diseases both internal and external are described and treatment offered. Veterinary students are given opportunity to assist in the Experiment Station work investigating diseases.

ELECTIVES.

During the last year of the course several electives are offered which include laboratory work in soil physics, agricultural engineering, dairying, etc.

HORTICULTURAL DEPARTMENT.

This Department gives both practical and scientific instruction. Its chief aim is in connection with the educational facilities offered in the College of Agriculture, to fit students to go back to the farms and to take a more intelligent interest in fruit growing. We also have frequent calls for well-trained men to take charge of large commercial orchards and fruit growing enterprises. Heretofore the demand for men trained for this sort of work has been greater than the supply. Occasionally a bright student, who wishes to take the time to do so, especializes in horticulture and fits himself for college or experiment station work in horticulture. A number of men who occupy important positions in horticulture in this country have received their horticultural training here.

In the four years course in agriculture enough horticulture is taught to enable the student to become well grounded in the practical and scientific phases of orcharding and gardening. He is not only taught to propagate, plant, prune, spray and how to manage fruits and vegetables by actual practice in the orchards and garden, but he also becomes acquainted with the principles of plant growth and plant culture and the relation of soil, climate, insect and fungous diseases and other phases of environment to horticultural pursuits. In connection with the work going on in the Experiment Station any student who wishes to specialize along horticultural lines may find ample opportunity to fit himself for advanced horticultural work.

The short course in horticulture, consisting of twelve weeks during the winter is designed to give practical instruction to fruit growers who

can spend only a short time here and wish to gain what practical instruction can be given in a short time. This is the only course of its kind now being given in the country. The students are taken to the orchards and vineyards and taught how to prune and manage fruits during the winter months. They are also shown how to make cuttings, how to graft and bud, how to plant and spray and to do all the practical details that are required on an up-to-date fruit farm. Several students who have taken this course have obtained good positions as managers or foreman on fruit farms in the State.

The appropriation of forty thousand dollars, made by the last Legislature for a horticultural building will enable the institution to greatly improve the facilities here for instruction in this line of work. It is planned to provide a library in which the leading literature on horticulture may be found, commodious class rooms where students may receive lectures, rooms for grafting, storing and packing grafts and fruit trees and where winter planting and budding may be carried on in the same way that it can be done out-of-doors during the regular season for such work. A small cannery will also be supplied so instruction can be given in utilizing what would otherwise be waste products of the orchard.

The day has passed when fruit growing is confined to the farm where general agriculture is the main interest and the commercial orchard of large area has become a reality. It has been demonstrated that fruit growing on a large scale may be made a profitable investment provided good training and business ability are employed to manage it. Many of the largest orchards in the world containing many hundreds of acres in some cases, are located in Missouri and these have shown that the possibilities for the profitable development of large orchards are great. In the future more and more of our commercial supply of fruit will be grown by specialists, who devote the same energy, intelligence and business ability to their business that is given to other great commercial enterprises. The day has also passed when it is necessary or desirable to spend a long series of years in an apprenticeship in fruit growing. By studying the underlying principles of the work, as taught in an agricultural college, one may now gain as much knowledge of real value in a short time as he formerly could in a number of years by practical experience alone. The practical experience of many others combined with scientific principles which it exemplifies, embraces more of value to the

student than his lifelong experience alone could ever teach him.

The above arguments plainly show the growing need of agricultural college training to the young man of to-day who would best succeed in fruit growing and the demand for this training is every year becoming greater.

ENTOMOLOGY.

The work in Entomology offered during the third and fourth years consists of lectures on the anatomy, habits and characteristics of insects. Students also make collections of specimens and classify them. The ravages made by insect pests on farm crops, fruits and vegetables year after year is the cause of enormous losses to farmers throughout the State. More attention is given, therefore, to injurious insects in order that the student may better understand their habits and more intelligently fight for their extermination.

HOUSEHOLD ECONOMY.

This Department was established at the beginning of the College year in 1900. Judging from its present popularity, and its completeness of equipment, it will soon become one of the leading departments in the College. The course is designed for young college women and others who wish to fit themselves for the management of the home on the best economic and hygienic basis. Two laboratory periods a week are given to the study of the principles of cooking. This embraces the study of foods and food values, marketing and practical cooking of meats, fish, vegetables, salads, etc. Courses are also given on home sanitation, house decoration and sewing. Besides the regular course, there will be offered next year a two years teacher's course for those who wish to make household economy a profession.

COURSES OF STUDY.

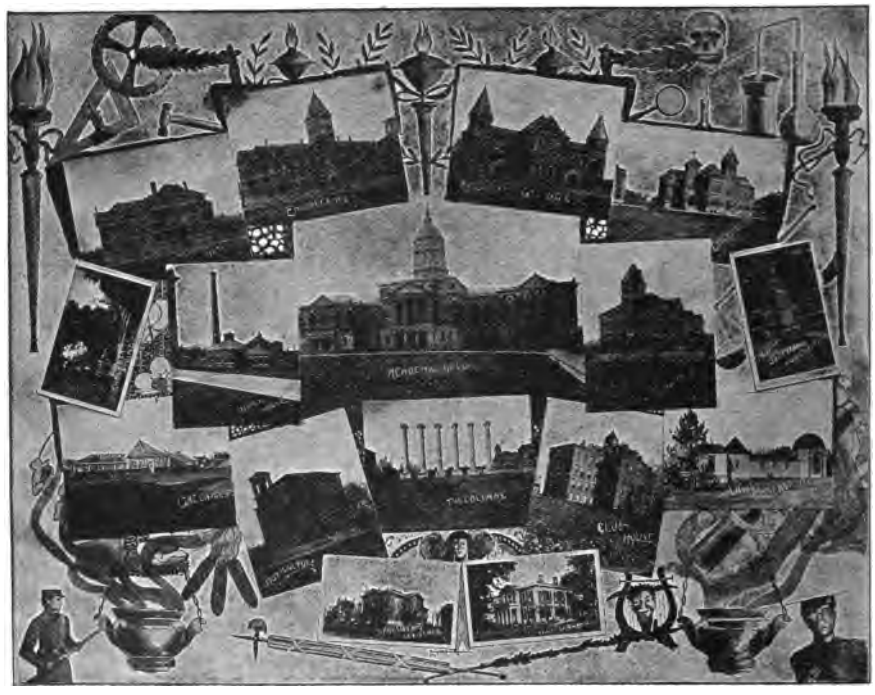
The courses offered in the College of Agriculture are several in number. The five years course leads to the degree of Bachelor of Science in Agriculture. Students in this course are given a broad training covering agriculture and the sciences relating to it, literature, mathematics, economics, etc. The student who completes this course is well equipped to practice farming according to modern improved methods, and at the

same time will be able to discharge the highest duties of citizenship. Many students who complete this course secure positions as teachers and investigators in agriculture. The four years' course leads to the degree of Bachelor of Agriculture and is identical to the first four years of the course just mentioned. For those who can spend but two years in college, a certificate is granted after the completion of the first two years of the long course.

The short winter courses in agriculture and horticulture are a recent departure and are fast becoming very popular. The work begins about January first and lasts twelve weeks. The instruction offered in these courses is the most practical kind. It covers such subjects as crop growing, stock breeding, feeding and judging, dairying, gardening, fruit growing, veterinary science, carpentry and blacksmithing and the work is arranged to meet the needs of young men who for one reason or another are unable to leave the farms except during the winter months. During the past winter many young men took advantage of the short courses and showed a great deal of enthusiasm. The eagerness, on the part of students who have patronized these courses, for more of this training, is leading the College authorities to think favorably of adding another session of more advanced work, thus making it a course of two winter sessions of twelve weeks each. Such a plan will doubtless be inaugurated during the coming winter.

A still more recent departure in the way of short courses are the summer courses in horticulture and agriculture for teachers. These courses were formed in response to a popular demand for elementary instruction in agriculture in the public schools throughout the State. During the last summer about seventy students took advantage of the work offered in these courses and were well pleased with the results. A much larger attendance is expected in the summer session of 1901. The demand for this work is such as to warrant a longer session hereafter. During the summer session of 1901, horticulture will be taught during the first six weeks instead of three, as formerly. The work will consist of plant studies with reference to horticulture, the growth and development of plants in relation to their surroundings, propagation of plants in nature and under cultivation; beautifying home and school grounds will each receive considerable attention. Immediately following the work in horticulture, a six weeks' course in agriculture is offered for the session

of 1901. The work in this course will be especially arranged to meet the needs of teachers in the State who will be expected to impart elementary instruction in agriculture. The introduction of elementary agriculture in the secondary schools is a movement in the right direction and the College is ready to give whatever encouragement it can in the way of training teachers for this work.



University of Missouri.

The above will give the reader something of an idea of the work now in progress at the Missouri College of Agriculture. With the new equipment which the Legislature recently provided for, the College will in the future have much better facilities for giving instruction of the right kind than ever before. The present prospects are that the Missouri College of Agriculture will soon rank among the foremost of its kind in America.

PRIZE ESSAYS.

During the winter of 1901 the State Board of Agriculture offered a first prize of twenty-five dollars and second prize of fifteen dollars, supplemented by a third prize of five dollars offered by Dean H. J. Waters for the three students who proved most proficient in judging farm animals and who could also present a creditable essay on "Profitable Beef Production." This act on the part of the Board of Agriculture and the Dean of the Agricultural College proved to be a great incentive to good work in this subject and added much interest. The prizes were contested for by about twenty-five short-course students. The first prize of twenty-five dollars was won by J. O. Erwin, Steedman, Missouri; the second prize, fifteen dollars, by R. L. Harbaugh, Liberty, Missouri, and the third prize, five dollars, by Earl F. Addy, Parnell, Missouri. Since stock judging requires considerable more work than the essay writing, the awards were made on the basis of sixty per cent for the judging and forty per cent for the essays.

The writer of the best essay did not win a prize because there were other students with a higher rank in stock judging. The essays are published in the order of merit. The first was written by R. D. Sterling, a graduate of Harvard University, now a stock breeder in Texas, the second by R. L. Harbaugh, Liberty, Missouri, and the third by E. F. Addy, Parnell, Mo.

I. PROFITABLE BEEF MAKING.

The first thing to consider in the science of making beef for profit is the type of animal which is to be bred and fed for the butcher. The one which experience has shown to be the most profitable is one having in general a compact form, small bone, wide and deep body with comparatively short legs. Other important points are a straight and wide back,

a deep and wide chest and a good deep hind quarter. The animal should also have a strong constitution combined with a gentle disposition. The breeds which more nearly approach the ideal type of beef form combined with good fattening and early maturing quality are the Shorthorn, the Hereford, the Aberdeen Angus and the Galloway. The main difference between them are those of size and some minor peculiarities of beef form. Some of the internal differences between these breeds and those of the so-called dairy breeds are the facts that the disposition of the fat in the former is among the muscular fibers of the meat instead of about the viscera, as in the latter, and that the beef breeds will generally dress a much higher percentage of high-priced meat.

Under ordinary circumstances it will not pay the feeder to buy pure bred animals, but he should select his stock carefully taking those of the best beef form from the common cattle of the country. As a rule good grade animals of any of the breeds are always obtainable. A common and profitable type is the grade cross between the Hereford and the Shorthorn. The animals when bought should be in a good, healthy and growing condition.

Before entering into the business of feeding cattle for profit, a prospective feeder should devote some time to the study of the composition of his feed stuffs as well as to the results of the feeding experiments which have been made by the various experiment stations and individuals throughout the United States and Europe. These may keep him from making mistakes which would otherwise cost him years of labor and money to discover. The principal ingredients of the common feeding materials are the protein, or nitrogenous compounds, the carbohydrates, and the fat or oil. The mineral matter of the plant goes towards forming the bones. The digestible nutrients of all of our common food stuffs are determined by the following method: An animal is closely confined and fed from zinc lined boxes in order to keep the food from being wasted. All of the food is carefully weighed and samples are taken each day for analysis. All of the solid excrement and the urine passed by the animal are weighed and analyzed. Then the difference in the protein fed to the animal and the amount passed out in the dung is the part that is digested and assimilated by the animal towards his growth, fat, and energy. From this can be calculated the percentage of protein digested and the same can be done for the carbohydrates and the fat. The ratio

which exists between the digestible protein in a given feeding stuff and the digestible carbohydrates plus the digestible fat is called the "nutritive ratio." It has been shown in these experiments that this ratio bears an important relation to the value of a food ration and that it must vary with animals of different ages if the best results are to be attained. For instance a growing steer would require a ration having a narrower nutritive ratio than a full grown animal. In this way feeding standards have been established which have been corroborated by the practical feeders and experiment stations of the country. The results are generally given in the form of tables showing the weights of dry matter, protein, carbohydrates and fat that a ration should contain in order to obtain the best gains per pound of feed. The feeder knowing the composition of his feedstuffs can compound his ration to conform to these standards. They can be made of infinite benefit to the inexperienced feeder.

Although the standard rations have been found to be the most profitable in most feeding countries, this is not always true. Sometimes it is cheaper to make the nutritive ratio a little wider. For instance, under conditions where corn is very cheap and other grain high in price. An extreme case is that of Texas, where cotton seed is abundant. There, the Experiment Station has shown that a ration consisting of one-half corn and one-half raw cotton seed, with hay for roughness gives the cheapest gains in fattening steers. In Missouri, corn is the most abundant of all grains, so it naturally follows that it must form the largest part of the grain ration.

The feeder as a rule does not care to breed his own calves for making beef for the reason that it requires that a large proportion of his investment must be in land and breeding stock. In case he buys his feeding cattle he should always bear in mind that well-bred stuff will give the best results in the long run. The material that he will probably have to select from will vary in age from young calves to three or four year old steers. The longer ages are hard to get except in western range steers which are harder to handle and more difficult to get in a fattening condition after being placed on feed.

The market demands that a finished beef animal should weigh from one thousand to fifteen hundred pounds in order that it should bring the highest price. This should determine the age that the steer should be put on the market. Ordinarily about two and one-half years is the right

age, but there may be cases with long-bodied and heavy-boned steers where it pays to feed longer, or with short-coupled and small-boned animals it may pay to put on the market earlier.

When feeding for baby beef it is the most common practice to take fall calves and put them on the market shortly before Christmas. In this way forcing methods are practical as far as possible. It really begins with a care of the dam during the period of gestation. She should have plenty of shelter and the same kind of food that a growing animal would require. This treatment should be continued until the calf is weaned at from six to seven months of age. A good ration for her would be 8 pounds of corn, 1½ pounds of oats, 10 pounds of clover hay and 10 pounds of timothy. The calf should be allowed to eat what grain he will with his dam and be gradually put on dry feed so that the weaning process will be as gradual as possible. After weaning he should get a ration something like this: Five parts corn, 3 parts oats, 2 parts bran and clover hay for roughness. In the spring, turn him on clover pasture and widen the grain ration by omitting the oats and bran. During the last ninety days of feeding, add oil meal gradually to his feed, beginning with half a pound and increasing until three pounds is reached. When marketed in December he should weigh about a thousand to twelve hundred pounds. Baby beef making has developed into an art by itself and requires the best of care and good judgment to make it profitable. If the animal should get off his feed even once during his lifetime it may turn the profit into a loss.

A common practice is to buy yearling "stockers" in the spring. Allow them the run of a good bluegrass pasture during the summer and fall. When the grass begins to get short in the fall, begin to allow them clover hay and shock corn. About February 1, put the steers on full feed of ear corn and clover hay. Turn them on bluegrass by May 1, continuing the ear corn. About June 15 begin to add cotton-seed meal gradually to the ration until three pounds is reached. By about August 15, the animals should be fully ripe for the market.

The practice in feeding two and three year old steers is to get them on full feed as rapidly as possible and feed for a period of about one hundred and thirty days. If the animals are in poor condition when bought they should be put on full feed more gradually and the feeding period lengthened. An extreme period would be about two hundred and

fifty days. In some parts of the country it may pay to feed old bulls and sometimes old cows, but this can not be made as profitable here as in the West, where comparatively young stock of this kind is sold off of overstocked ranges.

It is the concensus of opinion among feeders that it pays best to finish a steer for the market while running on bluegrass. This is probably true but as long as conditions remain as they are at present there is money to be made by feeding cattle at all times. The feed lot should be placed on sloping ground so that it will be as well drained as possible and protected from the wind. It should be large enough to give the steers plenty of exercise, but no more than necessary for their health. On the windward side should be an open shed where the animals can always find dry shelter when they desire it. Feed and water troughs as well as hay racks should be placed in the lot where they can be easily reached with a wagon. Always keep good pure water before the steers as well as salt.

A good feeder will always keep his stock in a good healthy condition. There is often a desire to put animals on full feed too suddenly. The necessary time to accomplish this may take from thirty to sixty days, depending on the age and previous habits. Young animals and those that have been fed roughage only, are harder to put on full feed than older ones that have been fed some grain. Absolute quiet and regularity in feeding are necessary to obtain good results. A noisy man can never be a good feeder. Towards the end of the feeding period it is often customary to make changes or additions to the feed ration, such as adding corn meal, cottonseed or linseed meal. Changes should always be made so gradually as to be practically imperceptible to the steer. Sudden changes in feed or habits of feeding are disastrous to profitable feeding and the condition of the animal as a rule tells the skill of the feeder.

II. PROFITABLE BEEF MAKING.

This subject is well worth the consideration of every farmer who contemplates feeding cattle for market. To derive the most profit in feeding is the prime object, and the feeder should select as his foundation good steers from twelve to fifteen months old that weigh eight hundred to one thousand pounds. These should be selected from one of the beef breeds, the three most important of which are the Shorthorns, Herefords and Aberdeen Angus.

The feeder will be governed largely by his location and surroundings as to what kind of cattle he feeds and the length of time he feeds them. The cattle should be high grades of whatever breed they may be. Care should be exercised in selecting only those that have a good beef type, such as a general thrifty appearance with a good straight back, a good underline, a well sprung rib, good heart girth, full breast, wide loin, wide straight rump, full in twist and square buttock, with fine bone and short clean legs. The feeder of beef cattle must bear the above points in mind in selecting steers for the feed lot, for they are essential to a good feeding steer and the object in view in feeding is to get the best gain in proportion to the amount of feed consumed to mature them for the block at the earliest possible time and to produce a high selling carcass.

These cattle should be secured in November or not later than December, when they can be very cheaply kept on stalkfields for the first month or until January first, when they should be put in feed lot with a good shed open to the south, with plenty of good water from spring or well accessible at all times. Good gains can not be made without plenty of water.

Commence feeding steers by giving shock corn in racks as the labor of husking corn is saved by feeding corn in this way. The amount should be gradually increased until they are on full feed. Continue in this manner for two months, then feed snapped corn with all the bright clover or cowpea hay they will eat until grass has plenty of growth and substance or until the first or fifteenth of May. Then turn the steers on grass and continue the snapped corn a few weeks, then change to shelled corn, about three pounds of cottonseed meal or linseed meal per steer per day. Cattle fed in this manner will have a good finish and glossy coat which is very desirable in a fat steer. Cattle should have the very best of attention while on feed and should be fed with absolute regularity. All changes in the feed of fattening cattle should be made very gradually so as to prevent scouring and to keep them on full feed, thus saving valuable time and feed. Once a day is sufficient when on grass and their feed troughs should be well cleaned each time. Salt should be kept where they can have access to it at all times. Steers fed in this manner should be ready for market from the first to fifteenth of July, when as a rule, the price of beef cattle is quite satisfactory and this is early enough

to avoid most of the heat and flies. The mistake must not be made of putting them on the market before they are fully ripe for the block—a mistake made by many feeders. Steers fed in this manner should make a gain of from two to three pounds per day for the full time on feed. They should be followed by hogs to pick up all corn wasted by the cattle. On the average, two shoats can be kept after one steer, and hogs should make a gain of one pound each per day.

The reasons for summer feeding are that the weather is more favorable for the laying on of fat and the grass balances the ration when the steer most needs it.

If the proper care is used in selecting feeders, there is a good profit in the business of fattening cattle for market where grain is not too high and good grass can be had for the cattle in summer when they are to be finished. If a man has not a taste for handling live stock he had better leave the business of feeding cattle to some one else. This State is well adapted to the feeding of cattle, as we can raise good grass, hay and corn at comparatively small cost. We are also situated between the great corn states of Illinois, Iowa, Nebraska and Kansas where we can supply our feed lots with the concentrated feed of corn, also close to the mills that produce the cottonseed and linseed meals which are useful in finishing of cattle. We are also situated in close proximity to one of the largest packing centers of the United States, which gives us a good market for beef and hogs, without having to ship a great distance. Kansas City is also one of the largest feeder markets in the west, where the buyer of feeders can be supplied on short notice and with any kind of cattle he may wish to purchase.

The demand for beef is increasing every year as the population of the world increases, and the markets of the world are open to the producer of beef of the United States. The demand for beef will increase and the producer of beef will have a good profitable business if properly handled.

Too much care can not be exercised in buying feeding cattle. Be sure that they have not been burned out with too much concentrated food, especially corn, before you get them as in that case they will not be profitable to feed. On the other hand do not purchase cattle that have been half starved when young as they will be so weak that they will waste much valuable time and feed in getting started and may never make good gains.

III. PROFITABLE BEEF PRODUCTION.

The first thing to be taken into consideration in the science of profitable beef production is the animal on which it is to be produced.

It should be an animal of good constitution, gentle disposition, symmetrical form, heavily quartered, broad back, good quality, fine well carved skeleton, built close to the ground.

The breeds which best represent this type of cattle are the Shorthorns, Herefords and Angus, but since public as well as private experiments so widely differ in the ranking of the three, it will have to be left to the feeder's surroundings and personal observations and preferences, but the individual is far more important than his breed. As a rule the regular feeder finds it more satisfactory to buy his cattle than to raise them.

First, because it would take such a large per cent of the average feeder's capital invested in breeding stock, land and improvements that he could not well carry on his feeding business.

Second, because breeding and feeding cattle are two somewhat distinct occupations, each of which will fully tax the abilities of the average man, and are not likely to be combined successfully except on a moderate scale.

It has been found by statistics that more cattle die every year in the United States before they are eighteen months old than all other ages combined. So to avoid these losses as well as the extra labor attached to calf raising, it is best for the feeder to buy his stock cattle in the fall before they are two year olds. Buy them after they have been taken off grass and are thoroughly dried out for winter and by this means take advantage of the shrinkage which is inevitable in the process of taking cattle from green to dry feed, and which amounts to from 25 to 75 pounds per head, making quite an object in a car load.

Allow them to clean up the pastures, which as every feeder knows, the fat cattle must not be forced to clean up. Then they should be fed either shock corn or allowed to run in stalk fields with plenty of straw and clover or cowpea hay during the winter. They should have good, well-ventilated, well-bedded, comfortable sheds with salt and water at their disposal always.

When buying stock cattle, care should be taken to buy as near a uniform bunch as possible and also a class of cattle that will mature around 1400 pounds, for cattle this size can be used in every way beef is used, while the 1600-pound steer has but one bidder, the exporter.

SEASON OF THE YEAR TO FEED.

Experiments shows that one hundred pounds of gain can be produced much cheaper in summer than in winter. Cattle on an average put on one pound more beef daily in summer on the same amount of feed.

The expenses in winter feeding are so much heavier than those in summer that it makes winter feeding a close business as a rule. In winter feeding the expense of getting the ground in shape for your roughness, seed, labor in sowing, mowing, stacking and hauling the roughness and scattering the manure are to be taken into consideration, also rent. In summer feeding there is no expense connected with the procuring of roughness except the rent.

The manure, too, is an object to be calculated on. In summer feeding, instead of the manure being dropped in a dry lot where it is not needed and where nine-tenths of its manurial value is washed away, it is evenly distributed over the pastures.

In summer feeding, hogs are more healthy on account of the exercise taken, the variety of their feed and not piling up at night.

Gillet, the greatest individual cattle feeder of the past century, once said: "I can not afford to feed in winter, because winter fed steers are too 'dry,' while summer fed cattle are sappy and full of water, and five cents per pounds is a good price for water."

Experiments carried out in Iowa in 1890 and closely followed by others in Kansas, show that it takes about one-third more pounds of grain to make a given gain on a three-year-old than on a two-year-old, and that it is harder to profitably put beef on a mature animal than on a growing animal.

As five-sevenths of the cattle in Chicago in 1899 were young and not fully matured cattle, and as experiments as well as private opinions in general favor young feeders, this ought to be conclusive evidence in favor of young feeders.

The basis of all feeding north of the cotton belt must be corn, not

only on account of its feeding value or its convenience, but on account of the expensiveness of fancy southern feeds which yield their feeding unprofitable except in limited quantities. Corn contains more fat-forming substance than any other or our grains for the price, so it naturally heads the list. Bran has been found to be of great value when fed with corn, especially in winter, on account of its high content of protein. But on account of its present price very little of it is used. It has also been proven at the different experiment stations and by practical experience that corn is not only the cheapest grain, but the cheaper it is fed the better. It rarely pays to crack or grind it when hogs are following and on a good price.

Bluegrass affords perhaps the best all around pasture of any of our grasses.

For dry forage, clover and cowpea hay stand at the head of the list of dry roughnesses, but on account of the extra expense of using dry forage, as before stated, it is plain that grass is the cheapest roughness to use. Gillet, the cattle king of the past century and Rankin, the largest individual cattle feeder in the world to-day, both feed on bluegrass as much as possible.

Other conditions being equal, the longer the fattening period, the larger the quantity of feed required for a given gain.

At the Kansas Station it was found that it took, in a one hundred and twelve day feed, 740 pounds of feed to produce 100 pounds of beef, and in 190 days feeding it took 1000 pounds to make the same gain.

Then another fact along this line which has been proven not only by public but by private experiments is that cattle make their cheapest and most rapid gains in the first period of a long feed. It follows, therefore, that the feeder should make the period as short as possible, at the same time being sure to properly finish his cattle. This will noturally vary with the age, condition and thrift of the cattle when the finishing process begins. They go to market, ripe, solid and smooth and with a glossy coat, instead of being patchy and soft.

At the risk of repetition, I will follow as closely as possible the way it sees most profitable to produce beef.

The stock cattle should be bought in the fall at the age of eighteen to twenty months, after they have been taken off grass and thoroughly dried out. Allow them first to clean up the grass which the fat cattle

have left in the pastures, then either feed them shock corn or give them good stalkfields to run on in daytime, with good comfortable shelter at night with a rack of clover hay convenient, and pure salt and water at their disposal always. With this care, put them through the winter.

When grass comes, put them on rich bluegrass pasture as early as possible and through the months of May and June give them grass alone. About July begin giving them about one-half feed of corn on the ear, well broken in sweet clean troughs and by the end of the month they should be receiving all they will clean up once or twice a day.

A feeder should be careful to have the same man feed the cattle every day, to feed at regular hours, keep visitors away from them and in every possible way avoid exciting them.

Cattle should never be forced to wade mud for their water but should have good clean tanks of fresh water handy for them. Put enough hogs with them to clean up all the waste.

About September 1, if you think your cattle need a little more finish, give them a limited amount of cottonseed meal or linseed meal until the end of feed. About October 30, a few days before selling your cattle, determine if possible whether you are going to sell them to home buyers or ship them yourself. If to be sold at home, leave them on full feed and grass up to date of delivery, but if to be shipped they should be put in a dry lot about twenty-four hours before loading, with nothing but timothy hay and water, and by this means get all the corn out of them, for corn is a very heating substance, and in summer shipment they should be kept as cool as possible. Bed the car well and arrange if possible to have them arrive on the market early in the morning and they should be dry behind, hungry enough to eat and drink heartily before the buyer appears. Full cattle will always sell and weigh better than lank or loose ones. By this manner of caring for them you have them finished in the most profitable length of feed—100 to 120 days, and you will be able to put them on the market just before the drag which the poultry and game season often produces on the market.

Live Stock Sanitary Regulations.

Reprinted from Bulletin No. 2.

In a number of states the sanitary regulations concerning live-stock are under the control of a Live Stock Sanitary Board. In Missouri this work devolves upon the Board of Agriculture, which has "charge of the veterinary service of the State, the appointment of the State Veterinarian, and, with the advice of the Veterinarian, of deputies, inspectors, and other assistants." The Board also has the power, with the approval of the Governor, to adopt and enforce rules and regulations governing the importation into this State or movement through the State of live stock capable of conveying any contagious or dangerous disease.

In the past there has been a great deal of confusion and dissatisfaction on account of the frequent changes in the quarantine regulations. A great deal of the territory bordering on the quarantine line is very rough and is not traversed by railroads or telegraph lines and it takes some time for the people to become thoroughly acquainted with any regulation of the Board. For this reason and for the further reason that the cause of the transmission of Texas Fever is now so well understood, regulations should be agreed upon by the State and Federal authorities, and then changed only by the united action of both.

When two powers seek to do the same thing, but act independently of each other, conflictions will certainly occur. It is my understanding that the Federal authorities are required to co-operate with the State authorities, and section 10555, Revised Statutes of Missouri, requires the Board of Agriculture and the State Veterinarian to co-operate with the United States officers, and yet without a joint action of the two Departments in formulating the regulations to be enforced, I can not see how a satisfactory co-operation may be effected or the best interests of the people served.

The State Board of Agriculture, at the meeting held December 19, 1900, ordered that southern cattle might be admitted into this State

during the months of November, December, January, February and March of each year, provided they were found free of infection by an agent of the Board. The Bureau of Animal Industry, Order No. 80, dated December 10, 1900, provided that cattle could not be admitted after January 1, 1901. This order was subsequently amended so as to admit cattle, upon inspection, until April 1, 1901.

We call attention to these facts to show the urgent necessity for co-operation in the adoption of the regulations as well as in their enforcement.

The following regulations have been adopted by the Board and approved by the Governor:

CATTLE QUARANTINE PROCLAMATION—SOUTHERN FEVER.

EXECUTIVE DEPARTMENT,
STATE OF MISSOURI,
CITY OF JEFFERSON.

By authority vested in me, and in accordance with section 10551 of the Revised Statutes of 1899, I, A. M. Dockery, Governor of Missouri, having approved the following quarantine regulations adopted by the State Board of Agriculture for the purpose of preventing the spread of contagious or infectious diseases among cattle, do hereby promulgate the same and order that the same be observed and enforced throughout the State.

That the cattle industry of the State may be more fully protected against Southern or splenetic fever, we do hereby declare the following quarantine line and regulations, which shall be in force from and after the date hereof, unless changed by the order of the State Board of Agriculture.

All that country lying south or below the following described line* shall be considered infected territory, and cattle from said country shall

* The line fixed and described is the same as the U. S. quarantine line which traverses the southern border of Missouri.

not be brought into Missouri only upon the conditions and under the regulations herein provided: * * *

First—Cattle from the above described infected territory shall not be transferred on foot into or through the State of Missouri, nor kept, grazed or watered on public ranges, unfenced lands, State lands, highways, or within the corporate limits of any town or city within the State except as hereinafter provided.

Second—All cars carrying cattle that have been brought from the above described territory into or through the State of Missouri, shall bear a placard setting forth plainly in large letters that said car contains southern cattle, and each way-bill of each shipment shall have a note upon its face with a similar statement. And when said cattle shall be unloaded at any point in this State for any purpose whatsoever, the places occupied by the animals shall be considered infectious grounds, subject to quarantine, and shall be immediately set apart by the owners or lessees of the property for the accommodation of southern cattle, and no other cattle shall be admitted thereto.

Third—All the stock yards which shall keep or receive southern cattle for trade or transit within Missouri shall provide for use a sufficient number of pens, to be used exclusively for the accommodation of cattle coming from within the territory above described. Such pens shall be marked or designated by reasonably large signs, conspicuously posted, and bearing in plain and large letters the words "Southern Cattle Pens."

Fourth—Cattle brought by boat from infected districts or all cattle on board boats that are carrying infected cattle shall be unloaded only at such points in this State as are provided with southern cattle pens sufficient for their reception, and the unloading and transferring from the landing to the stock yards must be under the instructions and regulations provided by an inspector of this department.

Fifth—The cars and boats used to transport such animals, the chutes, alleyways, and pens used during transportation and at points of destination, shall be disinfected in the following manner:

(a) Remove all litter and manure. This litter and manure may be disinfected by mixing it with lime or saturating it with a 5 per cent solution of 100 per cent carbolic acid; or, if not disinfected it may be stored where no cattle can come in contact with it.

(b) Wash the cars and the feeding and watering troughs with water until clean.

(c) Saturate the entire interior surface of the cars and the fencing, troughs, and chutes of the pens with a mixture made of 1½ pounds of lime and one-quarter pound of 100 per cent straw-colored carbolic acid to each gallon of water; or a solution made by dissolving 4 ounces of chloride of lime to each gallon of water may be used; or disinfect the cars with a jet of steam under a pressure of not less than 50 pounds to the square inch.

Sixth—It having been demonstrated beyond further controversy that the southern cattle tick (Boophilus bovis) is a means of disseminating southern or splenetic fever, it is ordered that all cattle infested with these ticks, without regard to the territory whence they originated, and cars and boats used for transporting them, shall be subject to all the rules and regulations herein provided governing the movement of southern cattle.

Seventh—Southern cattle, if upon examination by a live stock inspector of this State are found free of Texas fever infection and not infested with Texas ticks (Boophilus bovis) may be admitted to this State as natives during the months of November, December, January, February and March of each year unless such admission of southern cattle conflicts with the Federal quarantine regulations: Provided, first, that such cattle be rounded up and placed in an enclosure where the examination can be thorough and sufficient; second, that no examination shall be made and no permit shall be issued for such cattle until they are ready for immediate shipment or movement into the State; third, the cattle after the examination must not be driven through nor unloaded from cars in infected territory, and the cars used for shipping must be free from infection.

Eighth—The townships of Lowell, Garden and Spring Valley, in Cherokee county, Kansas, shall be considered infectious territory, and cattle originating therein may be admitted to this State as natives only upon permits issued by a live stock inspector of this State or by the live stock sanitary authorities of Kansas.

Ninth—The State Veterinarian and all deputy veterinarians and all live-stock inspectors in the employ of this department are charged with the enforcement of these regulations, and are hereby empowered to quarantine all cattle brought into the State in violation thereof, and to remove from the native to the southern division of any stock yard in this State

any such cattle or others that may be infested with Texas ticks or capable of spreading infection to native cattle.

The Executive Committee of the State Board of Agriculture is hereby authorized to make any changes in the above quarantine line and in the quarantine regulations herein described that may hereafter become necessary to fully protect the cattle interests of Missouri.

Note—These regulations are adopted by authority of section 10551, Revised Statutes of Missouri, 1899, which provides a penalty for violation of a fine of not less than $1,000 nor more than $10,000 for each and every offense, to be recovered in any county into or through which such stock is brought.

Sheriffs and constables in Missouri are hereby directed to enforce these regulations, and to arrest any and all parties who may be guilty of violation thereof.

In testimony whereof, I hereunto set my hand and cause to be affixed the Great Seal of the State of Missouri. Done at the [SEAL] City of Jefferson this 14th day of February, in the year of our Lord nineteen hundred and one.

By the Governor: A. M. DOCKERY.

SAM B. COOK, Secretary of State.

PROCLAMATION.

Rescinding the operation of the regulations contained in the proclamation of the Governor with reference to tuberculosis among breeding cattle, issued on the eighteenth day of June, 1900.

EXECUTIVE DEPARTMENT,
STATE OF MISSOURI,
CITY OF JEFFERSON.

By authority vested in me and in accordance with section 10551 of the Revised Statutes of 1899, I, A. M. Dockery, Governor of Missouri, having approved the following order of the Board of Agriculture, rescinding the quarantine regulations with reference to the introduction into Missouri of cattle (cows, bulls and heifers) for breeding purposes, do hereby promulgate the same and order that the same be in force from and after this date.

WHEREAS, It has been made known to the State Board of Agriculture that the quarantine regulations, with reference to tuberculosis among breeding cattle, adopted by a joint meeting of the Live Stock Sanitary Boards of Illinois, Kansas, Texas and Missouri, have been suspended by the authorities of Illinois and Kansas, and,

WHEREAS, The enforcement of the aforesaid regulations to be effective and satisfactory should be jointly maintained, therefore be it

Resolved, By the Executive Committee of the Board of Agriculture in regular session, that the regulations adopted by this Board and promulgated by proclamation of the Governor, issued June 18, 1900, with reference to the introduction into this State of cattle (cows, bulls and calves) for breeding purposes, are hereby rescinded and declared to be no longer in force.

In testimony whereof, I hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri. Done at the [SEAL] City of Jefferson this 15th day of March, in the year of our Lord Nineteen hundred and one.

A. M. DOCKERY.

By the Governor:

SAM B. COOK, Secretary of State.

RESOLUTIONS ADOPTED BY THE CENTRAL SHORTHORN BREEDERS OF AMERICA—KANSAS CITY, JANUARY 29TH AND 30TH, 1901.

WHEREAS, The tuberculin test of breeding animals now required by the quarantine regulations of the United States and Canada is proving hurtful to the cattle-breeding industry of America, and

WHEREAS, Experience has shown that the test is not an infallible agent to determine the presence of tuberculosis, that it is in no manner a preventive of the future development of tuberculosis in animals tested, that it is frequently productive of serious constitutional derangement in otherwise healthy animals, and

WHEREAS, While proving no substantial protection to our herd it

operates as a serious barrier to the exchange of breeding animals between different sections, and in many ways is hurtful to the cattle-breeding industry; therefore,

Resolved, That we respectfully petition the Honorable Secretaries of Agriculture for the United States and Canada and the State Sanitary Boards of the United States to so modify the quarantine regulations of their departments that the cattle breeders may be relieved of this menace to their herds and unnecessary restriction upon their business.

Resolved, That the Secretary of this Association be instructed to forward a copy of these resolutions to the Ministers of Agriculture for the United States and Canada and the Live Stock Sanitary Board of every State in the Union.

SHEEP QUARANTINE PROCLAMATION—SCABIES.

EXECUTIVE DEPARTMENT,
STATE OF MISSOURI,
CITY OF JEFFERSON.

By authority vested in me, and in accordance with section 10552 of the Revised Statutes of 1899, I, A. M. Dockery, Governor of Missouri, having approved the following quarantine regulation, adopted by the State Board of Agriculture for the purpose of preventing the spread of scabies, an infectious disease among sheep, do hereby promulgate the same and order that the same be observed and enforced throughout the State.

First—That the sheep industry of the State may be protected against scabies, we do hereby declare the following quarantine regulations, which shall be in force from the first day of April, 1901, unless changed by the order of the State Board of Agriculture.

Second—All sheep which have been exposed to scabies shall be dipped at least once previous to movement from one point within this State to another and in accordance with the formula and regulations of the United States Bureau of Animal Industry: Provided, that this rule shall not apply to sheep intended for immediate slaughter.

Third—Sheep that are affected with scabies shall not be shipped or driven from one point in this State to another unless said sheep shall

have first been dipped twice at intervals of ten days and in accordance with the formula and regulations of the United States Bureau of Animal Industry.

The dips now approved are:

1. The tobacco and sulphur dip, made with sufficient extract of tobacco to give a mixture containing not less than five one-hundredths of one per cent of nicotine and two per cent (sixteen pounds in one hundred gallons) flowers of sulphur.

2. The lime and sulphur dip, made with eight pounds of unslaked lime and twenty-four pounds of flowers of sulphur to one hundred gallons of water. The lime and sulphur should be boiled together for not less than two hours, and all sediment allowed to subside before the liquid is placed in the dipping vat.

All railroad, transportation and stock yard companies, and their employees, and all other persons are hereby forbidden to transport, drive or in any way handle sheep in Missouri except in compliance with the foregoing rules, under the pains and penalties of section 10553, Revised Statutes 1899, which provides a penalty for violation of a fine of not less than $50 nor more than $500, or by imprisonment in county jail for not less than one month nor more than one year for each and every offense.

Sheriffs and constables in Missouri are hereby directed to enforce these regulations and to arrest any and all parties who may be guilty of violation thereof.

In testimony whereof, I hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri. Done at the
[SEAL] City of Jefferson this nineteenth day of April, in the year of our Lord nineteen hundred and one.

By the Governor, A. M. DOCKERY.

SAM B. COOK, Secretary of State.

STATE VETERINARY SERVICE.

If a dangerous, infectious disease appears among the stock in any locality, the services of the State Veterinarian may be secured by com-

plying with section 10545 of the Revised Statutes of 1899. The calls for the Veterinarian are so numerous that he can not always meet them promptly, and a number of deputies have been appointed to assist him. All applications for the Veterinarian should be sent to the Secretary of the State Board of Agriculture, Columbia, Missouri, who has charge of the clerical work of the Veterinarian's office. The Veterinarian being engaged most of the time in answering calls, it is sometimes impossible to reach him for several hours, but all petitions are given as prompt attention as possible. No petition should be sent directly to any deputy veterinarian for they can not answer a call unless first instructed to do so by this office.

VETERINARY OFFICERS.

Dr. D. F. Luckey, Columbia, Mo.....State Veterinarian
Dr. E. M. Hendy, Jefferson City .....Deputy Veterinarian
Dr. R. B. Love, Springfield.....Deputy Veterinarian
Dr. E. J. Netherton, St. Joseph.....Deputy Veterinarian
Dr. E. Brainerd, Memphis.....Deputy Veterinarian
Dr. F. W. O'Brien, Hannibal.....Deputy Veterinarian
Geo. H. Boughner, St. Louis.....Live Stock Inspector
Joseph Bruser, Kansas City.....Live Stock Inspector
John Forbes, St. Joseph.....Live Stock Inspector
Dr. Jesse Robards, Thayer.....Live Stock Inspector
Andrew Brown, Kirbyville.....Live Stock Inspector
B. F. Milstead, Monett.....Live Stock Inspector

DUTIES OF LIVE STOCK INSPECTORS.

The following instructions are given by the State Veterinarian to the live stock inspectors.

First.—To prevent the introduction of southern cattle into the State of Missouri except as provided for by the Missouri quarantine regulations of 1901, and such amendments thereto as are subsequently made by the Executive Committee of the Board of Agriculture.

Second.—To locate all territory in your division of this State that may be now or in the future happen to become infested with fever ticks. Take any legitimate step necessary to prevent the ticks from spreading therefrom to any other territory in Missouri or in any other State. Place all infested cattle and pastures in quarantine and immediately report the same, giving location of infested areas, to the Secretary of the State Board of Agriculture. Use all possible means to the end of exterminating the ticks on such infested areas. Encourage the owner of infested cattle to grease them to prevent the further propagation of ticks. Advise the burning over of infested range and pasture in the fall and spring with a view to the destruction of the ticks. Carefully consult sections 10547 and 10550 of the Revised Statutes of 1899, which empower you to place diseased stock and infested enclosures under strict quarantine.

Third.—To answer all calls to inspect cattle intended for shipment to other parts of the State of Missouri or to any other state. All infested cattle, that is, cattle carrying Texas fever ticks, should be located by you and quarantined to prevent them from being driven to other parts of the State. You will be held strictly to account for any trouble arising from the neglect of these instructions.

By the inspection of cattle it is meant that you are to have them rounded up in a sufficient pen, chute or other enclosure and closely examine each animal. You may issue a permit for the movement of any cattle not carrying fever ticks. You are forbidden to issue any permit or certificate of inspection for any cattle which you have not personally and carefully examined and found free from disease.

NOTE.—The inspector receives a salary from the Board and can not make any charge for inspecting cattle.

REPORT OF DR. T. E. WHITE OF SEDALIA, MO., FOR FIRST QUARTER, 1900.

(Showing Work Done and Amount of Expense, and Per Diem.)

Date.	How Called.	Kind of Stock.	Owner.	Postoffice.	Disease.	How Disposed of.	Expenses.
Jan. 8.	Petition.....	1 Jennett.....	Z. T. Bergman.....	Fredericktown.....	Catarrhal Bronchitis..	Gave treatment.....	$178.60
" 11....	"	Cattle, 5 dead.....	George Warner	Neosho.....	Spinal Meningitis.....	" "	120.64

REPORT OF DR. D. F. LUCKEY OF COLUMBIA, MO., FOR FIRST QUARTER, 1900.

(Showing work done and amount of expense, and per diem.)

Date.	How called.	Kind of Stock.	Owner.	Postoffice.	Disease.	How disposed of.	Expenses.
Jan. 17.....	Letter.....	2 Horses.....	H. P. Scruby.....	Wheeling.....	Glanders.....	Quarantined.....	$ 5.90
" 18.....	Petition.....	1 Horse.....	C. D. Hall.....	Weston.....	"	"	14.50
Feb. 8.....	"	1 "	L. B. McFarland.....	Fairfield.....	Not diseased.....	.....	12.25
" 10.....	"	1 "	L. S. Keirsey.....	Ballard.....	Suppurating elephantisis..	Prescribed.....	8.55
" 11.....	"	1 "	W. T. DeWitt.....	Hortense.....	.....	Dead.....	8.05
" 17.....	"	1 "	W. M. Sanders.....	Breckenridge.....	Spinal Meningitis	"	12.10
" 20.....	Letter.....	6 Horses.....	Wm. Scruby.....	Wheeling.....	Glanders.....	Quarantined.....	16.95
" 22.....	Request.....	2 "	J. W. Wilson.....	Wheeling.....	"	"	
" 26.....	Petition	1 Horse.....	D. D. Bassett.....	Pleasant Gap.....	"	"	30.60
Mar. 17	Message.....	10 Cows.....	F. E. Haskins.....	Kirby.....	Indigestion.....	Prescribed..... .. .	12.04
" 19.....	"	1 Cow.....	John W. Grafford.....	Centralia.....	Pneumonia.....	Advised care.....	3.05
" 25.....	"	8 Cattle.....	James E. Bowlins.....	Odessa.....	Pneumonia.....	" "	16.15

I certify the above to be a correct statement.
D. F. LUCKEY, State Veterinarian.

REPORT OF DR. D. F. LUCKEY OF COLUMBIA, MO., FOR SECOND QUARTER, 1900.

(Showing work done and amount of expense.)

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.	Expenses.
April 1	Request	4 Calves	J. H. Hartley	Stockton	Scours	Prescribed	$14.06
" 13	Message	4 Horses	Wencel Fischer	Macon City	Rabies	Died	20.34
" 15	Letter	1 Horse	E. W. Morman	Chillicothe	Purpura Hemorrhagica		
" 18	Message	1 Horse	John Frick	Wellington	Laryngitis	Died	20.81
" 19	Letter	2 Horses	C. W. Lane	Linneus	Glanders	Quarantined	
" 20	Request	1 Mule	W. L. Moore	Linneus	Glanders	Quarantined	
" 22	Petition	2 Horses	August Heine	Craig	Crotalism	Prescribed	22.20
" 25	Letter	3 Cattle	John P. Hutchinson	Muddy Lane	Ergotism	Died	13.20
May 1	Letter	1 Horse	J. F. Finley	Breckenridge	Nephritis	Died	13.70
" 6	Petition	2 Horses	Hackler Rellieford	Fairfield	Strangles	Prescribed	18.90
" 9	Letter	3 Horses	Joseph Guthrey	Miami	Glanders	Quarantined	31.40
" 9	Petition	1 Cow	P. Burton	Butler	Tuberculosis	Died	
" 12	Letters	3 Horses	Theodore Shere	St. Louis	Glanders	Quarantined	
" 22	Message	10 Cattle	E. R. Casteel	Princeton	Rabies	Died	25.74
June 6	Letter	1 Horse	H. C. Duncan	Cameron	Glanders	Quarantined	27.15
" 6	Letter	2 Horses	W. C. Means	Clarksdale	Glanders	Quarantined	
" 8	Petition	1 Horse	Earl Casteel	Sturgeon	Pneumonia	Died	11.25
" 9	Petition	5 Horses	W. H Drunert	Waverly	Glanders	Quarantined	
" 13	Petition	1 Cow	John Walsh	Kahoka	Lump Jaw	Prescribed	16.06

I certify the above to be a correct statement
D. F. LUCKEY, State Veterinarian.

REPORT OF DR. D. F. LUCKEY OF COLUMBIA, MO., FOR THIRD QUARTER, 1900.

(Showing Work Done and Amount of Expense, and Per Diem.

Date.	How Called.	Kind of Stock.	Owner.	Postoffice.	Disease.	How Disposed of.	Expenses.
July 5	Petition	1 Horse	Jerry Proctor	Mayview	Chronic Glanders	Quarantined	$11.90
" 6	Request	1 Horse	S. M. Davidson	"	" "	"	
" 19	Petition	2 Steers	W. H. Taylor	Keytesville	Rabies	Died	15.27
" 21	Petition	2 Mares	Wm. Brookman	Rothville	Catarrh	Advised treatment	
" 23	Petition	1 Horse	A. B. Davis	St. Louis	Chronic Glanders	Quarantined	11.20
August 10	Petition	4 Horses	Frederick Hukrieds	Truxton	" "	"	27.54
" 18	Petition	1 Horse	J. J. O'Donell	St. Louis	" "	"	

I certify the above to be a correct statement.
D. F. Luckey, State Veterinarian.

REPORT OF DR. D. F. LUCKEY OF COLUMBIA, MO., FOR FOURTH QUARTER, 1900.

(Showing Work Done and Amount of Expense, and Per Diem.)

Date.	How Called.	Kind of Stock.	Owner.	Postoffice.	Disease.	How Disposed of.	Expenses.
Dec. 12	Petition	2 Horses	Abner Macom	Hillard	Glanders	Quarantined	$29.36
Dec. 20	Petition	3 Horses	Wm. Byers	Cole Camp	Glanders	Quarantined	25.64
Dec. 21	Petition	2 Horses	W. R. Bland	Lexington	Glanders	Dead	

I certify the above to be a correct statement.
D. F. Luckey, State Veterinarian.

REPORT OF DR. R. B. LOVE OF SPRINGFIELD, MO., FOR FEBRUARY, MARCH AND APRIL, 1900.

(Showing Work Done and Amount of Expense, and Per Diem.)

Date.	How Called.	Kind of Stock.	Owner.	Postoffice.	Disease.	How Disposed of.	Expenses.
Feb. 12	Petition	Horses and Mules.	Sam'l N. Hawkins	Exeter, (Barry Co.)	Glanders	Slaughtered	$31.20
Mar. 6	Letter	"	J. S. Hinson	Butterfield	Lymphongitis	Recovered	
Apr. 23	"	"	Mrs. S. M. Pigg	Springfield	Glanders	Slaughtered	

I certify the above to be a correct statement.
R. B. LOVE, Dep. State Veterinarian.

REPORT OF DR. E. M. HENDY OF JEFFERSON CITY MO., FOR 1900.

(Showing Work Done and Amount of Expense, and Per Diem.)

Date.	How Called.	Kind of Stock.	Owner.	Postoffice.	Disease.	How Disposed of.	Expenses.
July 18	Telephone	1 Mule	Joseph Kroll	St. Thomas	Nasal Gleet	Gave treatment	$ 9.00
Aug. 3	Telephone	5 Horses	Otto Drewell	Labaddie	Strangles	Gave treatment	17.80
" 23	Petition	1 Mule	Willis Vanderpool	Magill	Nasal Gleet	Ordered killed	32.80
Sept. 12				Fair Play			31.55
" 13	Telegram	1 Horse	Frank Klamer	Kahoko	Ulcerated tooth	Gave treatment	37.05
" 15	Telegram	Cattle, 10 dead	J. B. Arbuthnot	Brookfield	Enuphelitis	Gave treatment	27.95
" 18	Telegram	1 Mare	Dr. Max Starkloff	St. Louis	Chronic Glanders	Ordered killed	50.90
" 18	Letter	Cattle, 9 dead	Wm. Capps	Collins	Enuphelitis	Gave treatment	
" 22	"	1 Horse	W. L. Meyor	Dalton	Strangles	Dead	22.30
" 29	"	Cattle,	Mr. Wilhite	Chillicothe	Rabies	Dead	33.75
Oct. 1	"	5 Horses	John Kenny	Unionville	Strangles	Gave treatment	40.55
" 11		1 Horse	John Callahan	1441 Cleary Ave., St. Louis	Farcy	Ordered killed	
" 11	"	1 Horse	Mr. Dankler	3301 LaSalle st., St. Louis	Chronic Glanders	Ordered killed	51.20
" 11	"	1 Mule	Fred Burk	Seymour	Glanders	Ordered killed	
" 23	"	2 Horses	J. E. Kennedy	Bethany	Nasal Gleet	Gave treatment	44.50
" 29	"	20 Horses dead	Ad Fisher	Urich	Influneza	Gave treatment	
" 29	"	1 Horse	Ned Jackson	Platte City	Nasal Gleet	Gave treatment	43.65
Nov. 8	Telegram	1 Mare	Jesse Meadows	Chillicothe	Glanders	Ordered killed	33.65
" 17	Letter	2 Horses	Wm. Ivie	Kirksville	Chronic Glanders	Ordered killed	29.65

REPORT OF COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

Name.	When organized.	Where are grounds located.	Total amount indebtedness.	General condition of prop'rty	Total assets.	Name of President.	Name of Secretary.	Post Office address.	Total amount of premiums paid.	Expenses other than for premiums.	Total receipts.
Rich Hill Fair	1891	Rich Hill	$1,500	.....	$3,600	Hermann Loeb.	John D. Moore..	Rich Hill,.....	$2,108 37	$3,076 56	$5,236 16
Centralia Fair Asso.....	1895	Centralia.....	.....	good	.....	Wm. A. McCallister.....	F. G. Harris....	Centralia.....	3,000 00	1,500 00	4,500 00
Cape Girardeau County Fair & Park Asso.....	May 23 1898	Cape Girardeau	3,500	new	11,950	David A. Glenn	E.H.Engelmann	Cape Girardeau.	1,856 50	1,378 75	5,021 80
Bunceton Fair Asso.....	May 1896	Bunceton.....	.....	good	.....	J. G. Burger....	W. B. Kerns....	Bunceton.....	1,500 00	781 43	2,672 49
Dade County A. & M. Society.....	1885	Lockwood.....	530	good	3,300	C. C. McLemore	A. J. Young	Lockwood	259 20	731 85	991 30
Henry County Fair.....	1888	Clinton.....	.....	good	.....	.....	W. M. Goodwin	Clinton	.....	.....	.....
Jackson County A. & M. Society.....	May 1898	Lee's Summit...	.....	good	.....	E. T. Browning	L. Lampin Jr...	Lee's Summit...	2,587 00	623 83	3,452 31
North Missouri Agr. & Mech. Society.....	1889	Chillicothe.....	623	good	8,800	John W. Graves	S. D. Rohrer....	Chillicothe.....	2,535 10	1.259 33	3,971 69
.....	June 3 1889	Jacksonville	.....	good	2,200	Austin Crisman.	C. M. King.....	Excello.....	498 50	382 32	939 80
Citizens' Fair.....	July 23 1900	Althein.....	.....	.....	.....	.....	F. W. Brooks...	Althein.....	.....	.....	.....
Scotland County Fair....	1858	Memphis..	1,400	good	4,400	J. L. Sanders ...	N. M. Pettingill.	Memphis.....	1,800 00	500 00	2,700 00
Central Fair & Stock Association.....	1900	Bloomfield.....	.....	good	2,450	E.H. Holderness	Ed Moore.....	Bloomfield.....	1,200 00	100 00	1,550 00
Stoddard County A. & M. Society.....	1891	Dexter.....	1,500	good	1,700	Lee Williams...	S. P. Jeffres.....	Dexter.....	337 00	1,000 00	1,925 00

SUMMARY OF EXHIBITS OF COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

Name.	Speed Rings.						Live Stock.															
	Trotters.		Pacers.		Runners.		Total number entered	Draft horses	Coach horses	Roadster horses	Saddle horses	Cattle, beef breeds	Cattle, dairy breeds	Hogs, all breeds	Sheep, mutton breeds	Sheep, wool breeds	Poultry, all breeds	Farm and garden products	Farm implements	Ladies' department	Miscellaneous
	Total entered all ages.	Best time aged horses.	Total entered all ages.	Best time aged horses.	Total entered all ages.	Best time one mile.																
Rich Hill Fair	12	2:21	27	2:17¼	21	.....	155	5	*.....	.....	11	14	9	23	.....	.....	76	131	.....	210	
Centralia Fair	15	.....	8	.....	10	.....	154	.....	.....	27	18	.....	.....	43	.....	26	40	100	3	100	50
Cape Girardeau Co. Fair & Park Asso	12	.....	12	2:22	17	1:48	358	72	14	48	58	‡....	.....	27	‖	.....	46	150	.....	738	66
Bunceton Fair Asso	12	2:30	12	2:20	8	.....	410	14	.....	10	10	10	5	30	16	15	300				
Dade Co. A. & M. Society	6	2:24¾	6	2:33	20	1:50	221	27	†	20	3	12	30	18	7	.....	77	300	.....	375	50
Jackson Co. A. & M. Society	14	2:24½	17	2:15	.....	.....	690	12	4	48	31	47	12	46	10	.....	480	269	.....	718	100
North Mo. Agr. & Mech. Society	30	2:25	32	2:15	22	1:48	229	9	12	40	10	24	16	49	18	18	33	152	1	917	
Jacksonville Fair	.....	.....	.....	.....	.....	.....	323	35	15	61	34	48	2	15	.....	21	36	48	.....	218	
Citizens' Fair Asso	3	2:35	3	2:29	.....	.....	217	2	.....	5	3	1	16	60	20	10	100	.....	.....		
Scotland Co. Fair	87	2:22¼	28	2:22½	6	.....	147	18	5	30	10	42	10	9	.....	11	12	309	.....	157	
Stoddard Co. A. & M. Society	3	2:36	3	2:16	.....	2:51	126	.....	.....	5	2	3	15	16	3	2	80	25	.....	300	

*17 all purpose horses.

†27 all purpose horses.

‡76 cattle, beef and dairy breeds.

‖17 sheep, mutton and wool breeds

REPORT OF MISSOURI MUTUAL INSURANCE COMPANIES—1900.

Name of Company in Full.	Name and Address of Secretary.	Date Company was Organized.	Amount of insurance in force at last annual meeting	Amount of insurance written during the year.	Amount of losses sustained during the year	Average cost per $1,000 insurance for the last five years
Farmers' Mutual Fire and Lightning Insurance Co	A. M. Gregg, Kirksville	May, 1891	$605,484	$60,000		
Colfax Farmers' Mutual Protective Association	L. P. Coe, Tarkio	February 23, 1889	183,541	43,385		
The Mutual Insurance Companies of Rockport, Mo	H. F. Stapel, Rockport	1890	*22,390,478	*4,506,566		
The Farmers' Mutual Fire and Lightning Insurance Co	W. L. Fowles, Mexico	1893	873,000		$3,424 30	$10 00
Farmers' and Laborers' Co-operative Insurance Association of Audrain county	E. B. Norris, Mexico	March 28, 1891	579,782	160,345		3 00
The Farmers' Mutual Fire Insurance Co. of Barton county	M. L. Jackson, Liberal	March, 1893	700,000	148,000	1,200 00	1 90
Prairie Farmers' Mutual Fire Insurance Co. of Bates county	C. Hirni, Papinville	December 27, 1890	300,500	30,000		5 00
Home Insurance Co. of Lincoln, Mo	S. Henry, Lincoln	May 22, 1882	157,000	5,500	187 00	2 60
Fire Supporting Verein	Jacob Brunjes, Cole Camp	1877				
The Bollinger County Farmers' Mutual Aid Society	Jas. P. Simbaugh, Millerville	4th Saturday, Oct., 189	104,000		21 00	
Feuer Untersickerung Verein	Charles, Neuninger, Leopold	February 9, 1890	14,300	1,000		13 08
Caldwell County Mutual Fire Insurance Co	J. F. McNew, Cowgill	November 14, 1894	916,000	284,070	3,679 88	18 00
Farmers' Mutual Insurance Co. of Callaway county	A. Longley, Guthrie	February 1, 1896	720,060	113,873	1,903 75	18 00
Cape Girardeau County Farmers' Mutual Aid Association	H. F. Ueleke, J. P., Gordonville	March, 1868	1,397,000		2,160 00	10 00
Arnsberger Fire and Lightning Co	Chas. Bangert, Freidheim	October 16, 1880	850,000	10,000	2,061 00	7 00
The Farmers' and Laborers' Co-operative Insurance Co	H. K. Rhoades, Carrollton	April 8, 1893	820,493	274,580	1,861 63	3 10
Patrons and Farmers' Mutual Fire Insurance Co. of Cass county	P. H. Taylor, Harrisonville	April, 1877	1,485,852	416,104	3,594 16	3 07
Farmers' Mutual Fire Insurance Association of Cedar county	C. R. Church, Stockton	August 11, 1897	245,705	72,125	131 57	
Chariton Forks Farmers' Fire Insurance Co	Henry Rohwer, Forest Green	August 10, 1899				
Farmers' Mutual Fire Insurance Co. of Chariton county	Wm. L. McCampbell, Mendon	October, 1895	460,612		970 50	4 50
The Farmers' Mutual Insurance Co	John A. Dreir, Billings	January, 1890	1,000,000	100,000	900 00	1 90
Cooper County Farmers' Mutual Fire Insurance Co. of Bunceton, Mo	W. L. Nelson, Bunceton	February 6, 1896	564,695	94,960	320 00	2 50
Patrons' Home Insurance Co. of Clay county	W. E. Harbaugh, Rural Route, Liberty	1874	860,000	50,000	2,550 00	2 50
Crawford County Farmers' Mutual Insurance Co		1888	160,000	25,000	600 00	
Clay Farmers' Fire Association	H. H. Woestemeyer, Napoleon	August 3, 1881	498,875	74,300	1,122 09	3 50
The Farmers' Mutual Insurance Co. of Clark county	Wm. Ballard, Ashton	October 9, 1891	667,000	97,000	266 99	1 85
Farmers' Mutual Fire Insurance Co. of Clinton county	W. W. Silvius, Turney	1891	594,536	53,000	2,000 00	2 00
The Farmers' Mutual Fire Insurance Co	H. A. Nieman, Lockwood	May 9, 1892	457,575	101,489	1,326 57	14 00
The Farmers' Mutual Fire Insurance Co. of DeKalb county	G. F. Hofstatter, Maysville	August 16, 1890	1,475,000	440,000	4,448 50	1 00
Farmers' Mutual Fire Insurance Co. of St. John	A. T. Schultze, Washington	May 23, 1895	415,305	12,230	353 15	2 54
Clover Bottom Mutual Fire Insurance Co		January 1, 1869	1,378,660		2,080 00	2 50
Cedar Fork Mutual Aid Society against Fire and Lightning	L. H. Brinkman, Bremont	1871	800,500	3,000	1,300 00	1 50
The Farmers' Mutual Fire Insurance Co. of Gentry county	G. R. Williams, Albany	February, 1890	988,541	178,924	1,256 49	2 60
The Farmers' Mutual Tornado, Cyclone and Wind-storm Insurance Association of the 3rd Cong. Dist. of Missouri	John Kugler, Stanberry	March 17, 1892	5,011,473	1,519,881	391 32	4 00
Farmers' Mutual Insurance Co. of Grundy county	Geo. W. Frey, Laredo	February 16, 1895	638,348	307,285	2,120 17	3 77
Farmers' Mutual Aid Society of Hickory county	John T. Gentry, Weaubleau	December 10, 1891	235,000		372 50	1 00

*For 1899.

The Farmers' Mutual Fire and Lightning Insurance Co.	W. P. Meyer, Mound City	November, 1891	809,892	206,820	664 75	1 55
Jasper County Farmers' Mutual Insurance Co.	J. A. Magaffin, Carthage	January 4, 1896	275,000	90.000	1,100 00	4 80
Farmers' Mutual Fire Insurance Co. of Kock township	George Friedrich, Kimmswick	March 23, 1895	329,462	153,905	2,040 00	88
Johnson County Mutual Fire and Lightning Insurance Association	J. E. Mohler, Warrensburg	May 4, 1896	1,341,792	225,000	2,000 00	16 50
Farmers' Mutual Insurance Association	J. L. Cornelius, Edina	June, 1891	949,188	177,016	1,930 75	2 00
Patrons' Mutual Insurance Co. of Lafayette county	J. T. Ferguson, Odessa	October 23, 1875	248,372	58,743	.....	2 40
Freedom Farmer Fire Association	A. H. C. Hofemeister, Emma	January 19, 1867	1,253,500	41,785	4,255 25	3 00
Farmers' Mutual Insurance Co. of Lawrence county	H. F. Kaiser, Freistatt	1887	738,686	161,263	795 28	17 50
Grange Mutual Insurance Co. of Lewis county	C. O. Raine, Monticello	March, 1880	650,000	80,000	750 00	
Monroe Farmers' Mutual Fire Insurance Co	A. K. Baltezor, Chain of Rocks	September 1, 1899	30,527	8,630	.....	10 00
Farmers' Mutual Insurance Co. of Livingston county	Hugh Tudor, Dawn	February 26, 1891	1,250,000	274,000	3,841 82	09
Farmers' Mutual Cyclone, Tornado and Wind-storm Co., 2nd District	Hugh Tudor, Dawn	February 26, 1891	700,000	200,000	35 00	10
Farmers' Mutual Fire Insurance Co. of Linn township	A. B. Meyer, Jamestown	1895	197,000	.....	90 00	
Farmers' Fire and Lightning Mutual Insurance Co. of Macon county, Mo.	John Bevan, New Cambria	May 16, 1895	1,000,000	336,000	1,466 81	3 00
Farmers' and Laborers' Co-operative Insurance Co. of Monroe county	M. K. Curtright, Paris	April 22, 1892	1,103,046	155,000	5,302 34	4 30
Hazel Dell Farmers' Mutual Fire and Lightning Ins. Co.	A. J. Moser, Latham	February 22, 1896	304,760	63,085	964 05	5 25
German Mutual Benevolent Insurance Association of Tipton, Moniteau county	Adolph Koechner, Tipton	January 1, 1 93	86,120	6,070	.....	2 70
Highland Farmers' Fire and Lightning Insurance Ass'n	J. W. Mutti, California	May 29, 1895	76,000	9,000	.....	50
Farmers' and Laborers' Mutual Insurance of Montgomery county	W. L. Smith, Jonesburg	1891	640,440	88,184	361 80	65
Fire and Lightning Insurance Co. of Nodaway county	M. H. Gladman, Hopkins	May 12, 1891	1,305,250	293,810	1,994 00	19 25
The Farmers' Mutual Fire Insurance Co. of Conception, Mo.	August King, Conception	September, 1888	153,000	26,720	578 00	11 00
The Farmers' Mutual Fire Insurance Co. of Platte county	D. B. Higgins, Parkville	March, 1892	857,000	74,000	1,401 50	2 50
Farmers' Mutual Insurance Co. of Perry county	C. L. French, Brewer	May 30, 1890	231,880	71,576	10 00	7 00
Farmers' Mutual Fire Insurance Co. of Pettis county	Jas. S. White, Lamonte	March 23, 1894	586,361	181,636	1,344 16	15 60
Farmers' Mutual Fire and Lightning Association of Phelps county	J. N. Welch, Rolla	February 19, 1896	128,715	24,342	248 00	
The Pike County Fire Insurance Association	T. A. Wright, Edgewood	September 18, 1896	600,000	98,000	4,000 00	4 20
Farmers' Mutual Insurance Co. of Putnam county	H. E. Hanel, Unionville	March 12, 1896	400,952	24,524	2,290 67	15 40
Farmers' Mutual Fire Insurance Co. of Randolph county	Joe M. Haines, Darksville	February 26, 1897	717,775	255,236	2,288 98	70
Ralls County Farmers' Fire Insurance Association	S. A. Waters, Nadine	May 5, 1890	358,875	77,150	2,364 58	2 75
Patrons' and Farmers' Home Protection Co	W. H. Fitch, Richmond	February 26, 1877	585,172	167,810	3,145 00	3 60
Central Farmers' Mutual Fire Insurance Co.	F. H. Gentleman, O'Fallon	June 4, 1895	171,433	30,725	46 50	15 00
New Hope Mutual Fire Insurance Co. of St. Charles county	Aug. B. Voelkening, Augusta	March 7, 1868	188,729	5,680	.....	3 00
The Farmers' Private Fire Insurance Co. of Weldon Spring, Mo.	Richard Rosenthal, Weldon Spring	February 12, 1881	152,172	5,400	.....	1 00
Feuer Versicherungs Unterstutzungs Verein	John Nadler, New Melle	May 22, 1873	286,896	3,500	.....	1 50
Farmers' Mutual Fire Insurance Co. of St. Francois county	J. R. Pratt, Farmington	1892	222,000	36,350	7 70	7 50
Farmers' Mutual Fire Insurance Co. of St. Louis county, Mo.	J. H. Zelch, Clayton	April 1, 1875	2,475,234	631,162	.....	
Mercantile Town Mutual Insurance Co	J. W. Daugherty, St. Louis	April, 1896	1,730,401	.....	.....	
Marshall Town Mutual Fire Insurance Co	H. H. Hopkins, Marshall	May, 1897	1,711,800	497,883	9,524 58	
Farmers' Fire and Lightning Insurance Association	Geo. King, Queen City	August 10, 1877	459,155	.....	292 50	
Scott County Farmers' Mutual Aid Society	Casper Roth, Manning	April 21, 1890	222,720	.....	25 00	1 00
The Farmers' Mutual Fire Association of Shelby county	W. L. Shouse, Shelbina	October, 1896	1,123,000	424,000	2,166 19	12 50
Farmers' Mutual Fire Insurance Co. of Scotland county	J. L. Durnal, Memphis	October 15, 1890	900,850	158,702	4,289 40	21 00
Farmers' Mutual Insurance Co. of Sullivan county	J. C. Custer, Green Castle	February 13, 1896	636,514	72,000	3,050 88	3 10
Farmers' Mutual Fire Insurance Co. of Warren county	H. H. Gerdemann, Pendleton	November 7, 1889	299,410	86,624	700 00	7 50
Worth County Mutual Fire and Lightning Insurance Co	W. C. Gladstone, Jr., Grant City	1891	547,119	146,704	2,754 58	3 00
Farmers' Mutual Fire Insurance Co. of Wright county	.....	February 6, 1897	15,000	1,300	.....	

TABLE SHOWING NUMBER OF ACRES OF LAND IN EACH COUNTY ASSESSED FOR TAXES IN THE YEAR 1899-1900, TOGETHER WITH THE NUMBER OF HORSES, MULES, CATTLE, SHEEP AND HOGS AND THE TOTAL AND AVERAGE ASSESSED VALUE OF THE SAME AS RETURNED BY THE ASSESSORS FOR THE RESPECTIVE COUNTIES.

(See Auditor's Report.)

Name of County.	Land.			Horses.			Mules.			Cattle.			Sheep.			Hogs.		
	Number acres.	Valuation.....	Average value per acre.....	Number of.....	Valuation.....	Average value per head.....	Number of.....	Valuation.....	Average value per head.....	Number of.....	Valuation.....	Average value per head.....	Number of.....	Valuation.....	Average value per head.....	Number of.....	Valuation.....	Average value per head.....
Adair	360,700	$2,523,415	$6 99	8,839	$195,795	$22 15	834	$16,735	$20 06	23,223	$331,220	$14 26	3,415	$4,315	$1 26	12,999	$35,030	$2 69
Andrew	271,067	3,072,760	11 33	6,341	140,160	22 10	1,248	28,420	22 77	26,459	398,675	15 06	2,826	2,885	1 02	31,720	71,845	2 26
Atchison	328,473	4,652,150	14 16	8,985	192,090	21 39	2,612	57,805	22 13	34,123	571,865	16 75	1,051	2,110	2 00	46,764	131,595	2 81
Audrain	433,150	4,148,120	9 57	10,500	260,320	24 78	3,410	89,630	26 28	26,895	410,550	16 38	17,647	34,450	1 95	29,355	71,950	2 45
Barry	450,007	2,073,966	4 60	8,212	141,821	18 24	2,583	50,210	19 82	14,316	156,363	10 92	4,350	5,992	1 37	20,344	25,886	1 26
Barton	384,528	2,988,138	7 77	9,084	172,159	18 94	1,791	31,944	17 83	20,585	241,151	11 71	2,765	2,988	1 08	16,664	25,931	1 49
Bates	535,563	5,323,809	9 93	14,917	279,094	18 70	2,673	55,743	20 85	31,905	461,341	14 45	2,062	2,517	1 22	37,126	87,207	2 34
Benton	447 560	2,085,010	4 65	7,066	140,634	19 90	1,854	40,245	21 70	20,203	265,660	13 14	4,978	7,350	1 47	16,326	24,790	1 51
Bollinger	371,621	1,257,344	3 38	4,501	108,220	24 04	1,927	45,965	23 85	11,278	111,155	9 85	7,179	9,415	1 31	29,402	34,645	1 17
Boone	421,189	3,793,310	9 00	8,237	210,025	25 49	2,832	83,900	29 19	17,634	265,930	15 08	8,031	16,715	2 08	15,000	35,255	2 37
Buchanan	245,380	5,130,040	20 90	8,824	212,540	24 07	2,286	61,110	22 35	15,404	271,230	17 60	2,002	2,965	1 48	19,918	43,560	2 19
Butler	425,549	1,401.326	3 29	3,310	75,868	22 92	1,162	30,138	25 92	7,939	59,514	7 49	1,234	1,235	1 00	15,862	16,355	1 03
Caldwell	273,408	2,779,028	10 16	7,747	152,775	19 73	1,132	26,033	23 00	24,746	369,927	14 94	17,368	23,595	1 35	27,693	49,570	1 78
Callaway	515,623	3,212,270	6 22	8,447	173,410	20 52	3,465	80,900	23 34	17,822	266,375	14 78	18,060	28,675	1 58	20,442	38,825	1 89
Camden	330,761	1,182,450	3 57	4,601	95,089	20 66	1,215	29,535	24 30	11,913	172,205	14 46	6,846	10,304	1 50	16,104	21,117	1 31
Cape Girardeau	358,614	2,465,615	6 87	6,545	151,420	23 13	2,712	66,745	24 61	11,765	120,420	10 22	7,188	10,825	1 50	27,388	40,335	1 47
Carroll	435,795	4,539,191	10 40	11,781	233,526	19 81	3,789	83,027	21 91	24,552	314,861	12 82	8,423	9,081	1 07	35,567	42,881	1 20
Carter	320,104	915.187	2 85	1,002	27,182	27 13	687	23,325	33 09	3,880	40,039	10 32	487	504	1 04	7,647	8,155	1 06
Cass	441,548	4,891,253	11 07	12,088	237,738	19 66	1,931	39,234	20 31	26,095	374,679	14 35	4,389	5,803	1 32	38,902	89,249	2 29
Cedar	315,682	2,139,279	6 77	8,039	143,502	17 85	1,534	34,748	22 65	13,342	193,972	14 54	2,617	4,397	1 68	21,130	44,201	2 09
Chariton	474,496	3,614,724	7 62	11,807	227,324	19 24	2,417	46,166	19 09	26,966	342,871	12 70	5,267	5,518	1 04	24,303	34,510	142
Christian	334,808	1,627,437	5 03	6,242	120,806	19 30	1,712	38,735	22 62	12,657	163,320	12 82	3,837	4.938	1 28	23,655	28,437	1 20
Clark	320,141	2,439,860	7 62	7,141	139,122	19 47	586	13,280	22 66	15,428	229,225	15 03	4,409	6,505	1 47	9,619	33,075	3 43
Clay	251,528	3,142,350	12 49	6,550	160,595	24 51	1,208	29,810	24 67	20,788	294,437	14 15	6,980	11.045	1 58	23,906	57,960	2 42
Clinton	265,000	3,205,285	12 09	6,963	126,185	18 38	1,506	30,935	20 47	24,963	386,960	15 50	3,146	4,785	1 52	25,333	45,939	1 81
Cole	233,886	1,528,145	6 49	3,701	83,395	22 53	1,204	26,660	22 14	8,479	90,382	10 71	2,748	3,922	1 45	13,085	19,254	1 47
Cooper	348,708	3,578,225	10 26	6,927	166,075	23 83	3,663	112,300	30 66	17,589	300,175	17 06	5,992	12,275	2 04	22,293	50,600	2 22
Crawford	457,653	1,688,036	3 68	3,774	73,493	19 46	1,793	40,469	22 56	11,177	155,241	13 88	6,064	9,014	1 48	15,245	18,811	1 23
Dade	325,027	2,013,921	6 19	7,002	124,363	17 76	1,947	45,056	23 14	15,019	234,510	15 61	2,173	4,309	1 98	18,292	39,917	1 69

Dallas	290,320	1,040,336	3 58	6,107	100,295	17 89	1,341	26,882	20 04	11,266	141,957	12 60	7,424	10,848	1 46	18,674	25,000	1 33
Daviess	358,022	4,049,660	11 31	12,797	282,915	18 20	2,294	46,248	20 16	35,888	525,748	14 65	12,320	20,641	1 67	40,973	79,511	1 94
DeKalb	268,459	2,730,911	10 17	7,247	143,337	19 78	1,168	28,829	24 68	25,509	419,547	16 44	2,540	3,724	1 46	23,164	44,959	1 94
Dent	460,498	1,115,755	2 42	3,783	84,845	22 43	1,560	39,979	25 62	11,683	129,999	11 12	7,578	7,768	1 02	24,061	24,272	1 00
Douglas	438,746	1,889,687	4 21	6,127	105,978	17 29	1,301	27,612	21 22	12,856	151,513	11 79	7,875	11,567	1 46	22,849	24,295	1 06
Dunklin	288,606	1,550,853	5 37	5,409	128,145	23 69	3,589	86,148	24 00	14,226	119,583	8 40	816	935	1 14	29,824	38,075	1 27
Franklin	533,578	4,043,000	7 57	5,963	139,780	23 44	2,505	62,880	25 08	13,899	149,970	10 78	2,656	4,360	1 64	21,523	38,910	1 80
Gasconade	321,259	1,704,520	5 06	2,906	72,213	24 84	2,125	62,832	29 56	9,874	107,601	10 89	3,453	5,075	1 46	14,215	27,535	1 92
Gentry	310,333	3,106,335	10 09	11 611	217,840	18 76	1,011	21,550	21 31	31.368	491.400	15 66	17,151	17,660	1 02	29,140	75,595	2 59
Greene	419,719	3,650,144	8 69	13,920	269,245	19 34	3,857	79,756	20 78	22,107	251,978	11 39	4,463	5,334	1 19	32,103	39,829	1 24
Grundy	274,269	2,586,540	9 43	7,694	134,541	17 48	948	17,728	18 70	25,325	386,191	15 24	7,820	9,179	1 17	15,309	36,998	2 41
Harrison	455,556	4,180,043	9 17	14,643	283,738	19 37	1,855	37,520	20 22	42,589	794,099	18 64	8,737	17,332	1 97	37,148	81,626	2 19
Henry	460,243	4,160,750	9 04	9,280	183,430	19 76	2,471	54,010	21 85	25,413	331,345	13 03	1,738	2,580	1 48	22,830	53,570	2 34
Hickory	245,812	1,171,819	4 76	5,004	96,439	19 02	1,082	24,319	22 47	11,926	191,745	16 07	4,883	9,263	1 89	16,951	25,560	1 50
Holt	281,308	3,368,920	11 97	7,234	145,050	20 05	1,841	44,380	24 09	16,754	257,837	15 38	1,136	1,395	1 22	32,905	104,995	3 19
Howard	285,975	2,635,689	9 21	6,589	146,055	22 16	3,010	83,455	27 72	15,803	246,195	15 57	6,670	12,880	1 91	16,126	35,110	2 11
Howell	546,191	1,738,250	3 18	5,549	108,660	19 58	2,350	55,935	23 80	12,566	147,905	11 77	6,865	10,215	1 48	18 096	20,245	1 11
Iron	331,925	1,073,120	3 23	1,765	42,665	24 17	933	24,156	25 88	5,832	79,026	13 55	2,650	3,140	1 18	9,313	10,315	1 10
Jackson	358,990	8,058,200	22 44	17,559	364,584	20 76	3,103	70,040	22 50	22,583	358,133	15 85	8,592	10,470	1 21	28,739	55,372	1 92
Jasper	402,936	5,341,693	13 25	16,577	312,623	20 66	2,289	56,388	24 61	19,352	280,853	14 51	1,906	2,374	1 24	17,779	38,404	2 16
Jefferson	409,109	2,514,533	6 14	5,942	115,391	19 41	2,445	51,270	20 90	15,149	156,323	10 31	3,230	3,449	1 06	17,801	20,347	1 14
Johnson	517,848	5,573,680	10 76	11,063	222,992	20 15	3,295	74,073	22 44	27,568	878,293	13 70	5,648	5,653	1 00	30,022	61,215	2 03
Knox	314,713	2,510,605	7 97	5,631	123,686	21 96	1,318	28,120	21 33	20,235	306,159	15 13	4,917	7,243	1 47	15,230	44,486	2 92
Laclede	436,552	1,448,485	3 31	5,077	106,320	20 94	1,210	26,085	21 55	12,557	143,800	11 45	5,981	8,350	1 39	15,736	21,045	1 35
Lafayette	392,095	5,300,480	13 51	11,230	255,330	22 73	4,038	110,515	27 36	23.540	360,850	15 32	4,364	6,035	1 38	23,901	79,005	3 35
Lawrence	385,416	3,038,685	7 88	9,123	206,455	22 63	2,943	92,955	31 58	13,127	202,415	15 41	2.401	3,615	1 55	19,660	38,425	1 95
Lewis	319,330	2,551,790	7 99	7,419	151,405	20 40	1,129	27,610	24 45	16,752	325,170	19 41	10,435	12,920	1 23	14,935	36,740	2 47
Lincoln	390,810	3,386,470	8 66	7,217	146,290	20 26	1,157	25,470	22 01	15.102	204,622	13 54	4,583	8,015	1 74	23,474	45,660	1 94
Linn	385,504	3,158,543	8 19	10,042	192,115	19 12	1,034	21,611	21 21	35,828	546,582	15 25	7,738	7,738	1 00	14,414	30,930	2 17
Livingston	330,884	2,797,348	8 45	10,631	216,080	20 32	1,112	21,466	19 28	24,130	366,771	15 19	7,020	9,521	1 35	25,123	41,878	1 66
McDonald	293,055	918,933	3 13	4,520	80,322	17 77	1,348	27,591	20 46	7,454	89,204	11 96	4,502	4,502	1 00	14,471	14,874	1 02
Macon	515,550	4,089,965	7 93	13,339	303,603	22 76	2,745	59,915	21 82	29,887	483,395	16 17	8,985	12,910	1 42	17,525	41,045	2 34
Madison	292,010	904,650	3 09	2,392	52,550	21 96	1,307	33,165	25 37	7,592	89,734	11 81	3,514	3,952	1 12	13,663	15,048	1 10
Maries	325,800	1,119,189	3 32	3,699	67,987	18 36	1,847	38,606	20 89	12,065	141,829	11 75	6,274	6,274	1 00	21,995	21,995	1 00
Marion	276,612	2,792,595	10 09	7,221	150,920	20 90	1,292	30,035	23 24	11,560	161,160	13 94	7,180	14,505	2 02	15,137	35,060	2 31
Mercer	287,631	2,537,993	8 82	8,363	178,847	21 38	684	15,521	22 69	29,966	599,310	19 98	3,201	4,582	1 42	35,413	40,575	1 14
Miller	369,934	1,402,800	3 79	5,136	90,540	17 62	1,489	32,835	22 05	14,437	190,360	13 18	8,893	12,769	1 43	22,498	27,414	1 19
Mississippi	357,000	1,310,355	3 67	2,052	45,965	22 39	2,848	82,385	28 92	6,116	49,740	8 13	114	145	1 27	11,319	14,905	1 31
Moniteau	258,150	1,828,415	7 08	4,976	107,850	21 67	2,010	45,235	22 50	14,424	170,925	11 85	2,990	4,650	1 55	15,051	30,260	2 01
Monroe	422,429	3,453,880	8 17	8,787	179,420	20 41	2,902	66,020	22 73	23,332	338,340	15 15	22,615	36,810	1 62	17,132	43,520	2 53
Montgomery	331,457	2,433,255	7 34	6,060	148,085	24 43	1,652	39,695	24 00	15,282	202,355	13 24	5,283	11,490	2 17	16,602	41,895	2 52
Morgan	386,552	1,545,555	3 73	4,512	91,195	20 21	1,881	40,290	21 41	14,064	192,654	13 69	5,517	7,240	1 31	11,686	21,210	1 81
New Madrid	412,995	1,380,602	3 34	2,014	42,586	21 12	2,319	57,547	24 81	6,287	36,269	5 76	257	357	1 38	12,069	13,950	1 15
Newton	400,945	3,089,110	7 74	9,223	187,721	20 35	1,899	37,965	19 99	12,968	160,290	12 36	791	855	1 08	10,408	20,635	1 99
Nodaway	553,906	6,779,824	12 23	17,013	351,592	20 66	1,845	41,846	22 69	57,948	774,483	13 35	2,477	2,726	1 10	57,296	91,143	1 58
Oregon	448,269	1,277,055	2 84	4,089	79,464	19 43	1,430	34,153	23 88	9,536	101,302	10 63	3,149	3,149	1 00	13,090	13,090	1 00
Osage	368,359	1,902,532	5 16	3,467	78,815	22 73	2,832	74,890	26 44	13,467	151,881	11 27	4,739	6,808	1 43	20,219	29,867	1 47
Ozark	248,819	667,805	2 68	3,917	71,307	18 20	1,276	27,138	21 26	12,966	163,797	12 63	5,107	6,571	1 28	15,750	15,828	1 00
Pemiscot	293,988	1,302,988	4 43	2,182	65,695	31 12	1,834	78,175	42 79	7,244	64,946	8 96	401	530	1 32	11,511	18,970	1 64
Perry	295,900	1,482,095	4 83	4,406	100,709	22 85	2,458	60,633	24 71	9,299	92,619	9 95	5,894	7,416	1 25	28,146	33,897	1 20
Pettis	427,000	4,646,745	10 88	9,985	204,347	20 56	2,887	58,705	20 33	26,060	348,887	13 38	4,797	6,680	1 39	12.702	33,515	2 63
Phelps	388,632	1,241,207	3 15	4,095	74,950	18 30	1,275	26,359	20 66	11.438	140,364	12 27	4,922	5,022	1 02	15,491	16,572	1 06

TABLE SHOWING NUMBER OF ACRES OF LAND IN EACH COUNTY ASSESSED FOR TAXES IN THE YEARS 1899-1900, TOGETHER WITH THE NUMBER OF HORSES, MULES, CATTLE, SHEEP AND HOGS AND THE TOTAL AND AVERAGE ASSESSED VALUE OF THE SAME AS RETURNED BY THE ASSESSORS FOR THE RESPECTIVE COUNTIES.—CONTINUED.

Name of County.	Land.			Horses.			Mules.			Cattle.			Sheep.			Hogs.		
	Number acres.	Valuation.....	Average value per acre.....	Number of.....	Valuation.....	Average value per head.....	Number of.....	Valuation.....	Average value per head.....	Number of.....	Valuation.....	Average value per head.....	Number of.....	Valuation.....	Average value per head.....	Number of.....	Valuation.....	Average value per head.....
Pike	419,994	$3,981,060	$9 47	9,046	$180,345	$19 93	1,973	$54,245	$27 49	17,800	$312,255	$17 54	9,596	$18,260	$1 90	19,217	$44,840	$2 33
Platte	257,446	3,113,660	12 09	5,627	112,185	19 93	1,745	49,605	28 42	14,378	289,305	20 12	4,294	4,930	1 15	17,925	38,775	2 16
Polk	403,308	2,088,740	5 16	9,669	192,092	19 80	2,431	49,648	24 41	16,289	224,638	13 78	10,165	13,716	1 34	24,209	37,049	1 53
Pulaski	228,880	737,320	3 22	3,506	64,810	18 48	886	17,685	19 96	9,814	114,660	11 68	5,938	7,560	1 25	15,501	17,625	1 13
Putnam	329,798	2,400,797	7 27	10,706	188,786	17 63	740	14,278	19 29	30,727	423,726	17 79	8,754	11,132	1 27	16,743	25,934	1 54
Ralls	302,602	2,728,490	9 00	5,321	106,740	20 06	1,088	23,455	20 73	16,327	217,288	13 29	7,888	11,720	1 48	13,478	23,295	1 72
Randolph	305,200	3,016,110	9 88	7,558	172,330	22 80	1,618	39,260	23 64	15,560	266,615	17 06	9,095	18,565	2 04	7,849	19,520	2 48
Ray	355,078	3,847,627	10 83	11,792	243,815	20 66	3,656	98,830	27 03	30,876	491,015	15 89	6,154	10,025	1 62	51,588	100,550	1 94
Reynolds	490,354	1,173,338	2 39	1,985	55,654	28 03	1,340	43,497	32 45	10,533	135,355	12 85	3,295	6,014	1 82	22,435	29,619	1 32
Ripley	378,307	1,327,222	3 50	3,415	78,814	22 78	1,567	42,168	26 91	8,494	85,875	10 11	2,868	2,994	1 04	17,322	19,020	1 09
St. Charles	336,156	4,867,700	13 04	7,277	184,625	25 37	2,375	65,760	27 68	12,210	167,790	13 74	1,957	3,780	1 93	22,229	55,520	2 49
St. Clair	430,898	2,231,895	5 17	8,806	179,604	20 38	1,137	23,400	20 57	17,861	232,661	13 02	3,057	3,060	1 00	16,595	36,360	2 19
St. Francois	280,680	2,050,835	7 30	3,125	60,905	19 48	1,061	28,535	22 18	7,748	83,235	10 75	1,811	3,620	1 99	5,068	10,135	2 00
Ste. Genevieve	309,249	1,121,851	3 62	3,072	58,431	19 02	933	17,853	19 13	6,507	59,349	9 12	1,883	1,958	1 03	13,066	14,377	1 10
St. Louis	296,439	17,988,695	60 51	7,922	211,810	26 73	3,846	97,280	29 07	9,497	149,725	15 76	866	1,600	1 84	15,070	37,540	2 49
Saline	459,947	6,393,575	13 90	12,967	272,970	21 05	5,218	127,290	24 40	31,876	529,450	16 60	3,417	5,520	1 61	36,359	95,855	2 63
Schuyler	194,959	1,450,830	7 44	6,775	132,155	19 50	610	17,410	20 34	19,123	261,943	13 69	21,641	27,153	1 25	19,657	30,931	1 57
Scotland	278,233	1,994,430	7 16	6,729	168,125	24 98	755	16,630	22 01	20,895	303,490	14 52	6,944	11,780	1 69	12,751	34,190	2 68
Scott	263,259	1,750,480	6 64	3,246	78,453	24 16	3,548	108,743	30 65	9,755	92,086	9 43	662	1,004	1 51	20,668	26,456	1 28
Shannon	588,997	1,316,084	2 23	2,996	74,564	24 88	1,276	37,845	29 65	8,608	101,936	11 83	2,421	2,628	1 08	17,212	18,117	1 08
Shelby	316,326	2,830,105	8 94	9,310	214,011	22 98	2,148	52,620	24 49	19,257	303,058	15 73	10,982	15,791	1 43	19,076	44,976	2 35
Stoddard	507,678	2,425,353	4 53	6,437	143,273	22 25	3,080	76,622	25 28	12,538	110,540	8 94	2,094	2,206	1 05	82,804	83,869	1 01
Stone	239,691	738,138	3 79	3,542	73,706	20 80	1,140	28,646	25 12	9,473	122,431	12 92	3,377	5,116	1 51	15,031	17,865	1 18
Sullivan	413,096	2,527,757	6 11	12,384	238,824	19 28	1,228	25,948	20 56	46,635	731,792	15 69	9,436	9,905	1 05	16,809	30,038	1 78
Taney	215,186	613,052	2 89	3,689	67,410	18 30	1,057	22,338	21 13	14,386	152,818	10 62	3,505	3,511	1 00	14,578	14,562	1 00
Texas	662,047	2,014,655	3 04	8,008	151,120	18 84	2,318	52,345	22 58	17,453	200,610	11 49	12,484	18,900	1 46	33,609	36,210	1 07
Vernon	529,510	4,626,023	8 74	13,762	258,097	18 39	2,340	50,996	21 79	28,594	411,921	14 40	3,234	4,810	1 48	26,810	54,403	2 02
Warren	252,000	1,653,320	6 56	3,314	78,620	23 72	1,255	34,040	26 32	8,789	103,580	11 78	2,339	2,795	1 19	15,232	27,305	1 79
Washington	472,050	1,746,260	3 69	3,533	64,151	18 15	1,489	30,752	20 65	11,340	109,034	9 61	3,669	3,838	1 04	14,452	19,984	1 31
Wayne	475,436	1,144,324	2 41	3,498	95,852	27 44	1,943	62,030	31 92	13,280	154,193	11 61	3,008	5,670	1 88	23,235	31,290	1 34
Webster	369,704	1,501,001	4 06	6,195	107,858	17 41	1,943	41,113	21 55	12,758	128,479	10 07	9,993	12,524	1 25	19,732	22,058	1 11
Worth	169,689	1,591,588	9 43	6,214	154,905	24 92	417	10,585	25 38	17,830	337,512	18 92	6,964	9,905	1 42	15,614	50,679	3 24
Wright	408,792	1,412,537	3 49	5,487	112,185	20 44	1,478	33,981	22 48	11,731	153,912	13 12	11,092	19,927	1 70	21,204	25,116	1 13
St. Louis City	12,705	9,948,600	783 04	12,960	416,880	32 16	600	15,910	26 51	6,110	106,120	17 36	.....	.....	.....	50	250	5 00

NUMBER AND VALUE OF FARM ANIMALS OF THE UNITED STATES FROM 1880 TO 1900.

(From the annual report of the Department of Agriculture.)

Dec. 1st.	Horses.		Mules.		Milch cows.		Oxen and other Cattle.		Sheep.		Swine.		Total Value Farm Animals.
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	
1880	11,201,800	$613,296,611	1,729,500	$105,948,319	12,027,000	$279,899,420	21,231,000	$341,761,154	40,765,900	$90,230,537	34,034,100	$145,781,515	$1,576,917,556
1881	11,429,626	667,954,325	1,720,731	120,096,164	12,368,653	296,277,060	20,938,710	362,861,509	43,569,899	104,070,759	36,247,683	170,535,435	1,721,795,252
1882	10,521,554	615,824,914	1,835,169	130,945,378	12,611,632	326,489,310	23,280,238	463,069,501	45,016,224	106,595,954	44,122,200	263,543,195	1,906,468,252
1883	10,888,110	765,041,308	1,871,079	148,732,390	13,125,685	396,575,405	28,046,077	611,549,109	49,237,291	124,366,335	43,270,066	291,951,221	2,338,215,768
1884	11,169,683	833,734,400	1,914,126	161,214,976	13,501,206	423,486,649	29,046,101	683,229,054	50,626,626	119,902,706	44,200,893	246,301,139	2,467,868,924
1885	11,564,572	852,282,947	1,972,569	162,497,097	13,904,722	412,908,093	29,866,573	694,382,913	50,360,243	107,960,650	45,142,657	228,401,683	2,456,428,383
1886	12,077,657	860,823,208	2,052,593	163,381,096	14,235,388	389,985,523	31,275,242	661,956,274	48,322,331	92,443,867	46,092,043	196,569,894	2,365,159,862
1887	12,496,744	901,685,755	2,117,141	167,057,538	14,522,083	378,789,589	33,511,750	663,137,926	44,759,314	89,872,839	44,612,836	200,043,291	2,400,586,938
1888	13,172,936	946,096,154	2,191,727	174,853,563	14,856,414	366,252,173	34,378,363	611,750,520	44,544,755	89,279,926	44,346,525	220,811,082	2,409,043,418
1889	13,663,294	982,194,827	2,257,574	179,444,481	15,298,625	366,226,376	35,032,417	597,236,812	42,599,079	90,640,369	50,301,592	291,307,193	2,507,050,058
1890	14,213,837	978,516,562	2,331,027	182,394,099	15,952,883	353,152,133	36,849,024	560,625,137	44,336,072	100,659,761	51,602,780	243,418,336	2,418,766,028
1891	14,056,750	941,823,222	2,296,532	178,847,370	16,019,591	346,397,900	36,875,648	544,127,908	43,421,186	108,397,447	50,625,106	210,193,923	2,329,787,770
1892	15,496.140	1,007,593,636	2,314,699	174,882,070	16,416,351	351,378,132	37,651,239	570,749,155	44,938,365	116,121,290	52,398,019	241,031,415	2,461,755,698
1893	16,206,902	992,225,185	2,331,128	164,763,751	16,424,087	357,299,785	35,954,196	547,882,204	47,273,553	125,909,264	46,094,807	295,426,492	2,483,506,681
1894	16,081,139	769,224,799	2,352,231	146,232,811	16,487,400	358,998,661	36,608,168	536,789,747	45,048,017	89,186,110	45,206,498	270,384,626	2,170,816,754
1895	15,893,318	576,780,580	2,333,108	110,927,834	16,504,629	362,601,729	34,364,216	482,999,129	42,294,064	66,685,767	44,165,716	219,501,267	1,819,446,306
1896	15,124,057	500,140,186	2,278,946	103,204,457	16,137,586	363,955,545	32,085,409	508,928,416	38,298,783	65,167,735	42,842,759	186,529,745	1,727,926,084
1897	14,364,667	452,619,396	2,215,654	92,302,090	15,941,727	369,239,998	30,508,408	507,929,421	36,818,643	67,020,942	40,600,276	166,272,770	1,655,414,612
1898	13,960,911	478,362,407	2,190,282	96,109,516	15,840,896	434,813,826	29,264,197	612,296,634	37,656,960	92,721,133	39,759,993	174,351,409	1,888,654,925
1899	13,665,307	511,074,813	2,134,213	95,963,261	15,990,115	474,233,925	27,994,225	637,931,185	39,114,453	107,697,530	38,651,631	170,109,743	1,997,010,407
1900	13,537,524	603,969,442	2,086,027	111,717,092	16,292,360	514,812,106	27,610,054	689,486,260	41,883,065	122,665,913	.....	.....	2,042,650,813

ESTIMATED PRODUCTION AND VALUE OF THE PRINCIPAL CEREAL CROPS OF THE UNITED STATES FOR THE YEAR 1900.

(From Report of the Department of Agriculture.)

Name of Crop.	Area.	Production.	Farm value Dec. 1st.	Value per bushel Dec. 1st.	Yield per acre bushels.	Value of yield per acre Dec. 1st.
Corn	83,320,872	2,105,102,516	$751,220,034	$0.35	25.3	$9.02
Wheat	42,495,885	522,229,505	323,525,177	.620	12.3	7.61
Rye	1,591,362	23,995,927	12,295,417	.512	15.1	7.73
Oats	27,364,795	809,125,989	208,669,283	.258	29.6	7.63
Barley	2,894,282	58,925,833	24,075,271	.408	20.4	8.32
Buckwheat	637,930	9,566,966	5,341,413	.558	15.0	8.37
Hay	39,132,890	50,110,906	445,538,870	*8.89	*1.28	11.38
Potatoes	2,611,054	210,926,897	90,811,167	.431	80.8	34.82

*Per ton.

INDEX.

Annual Meeting 5
Board of Agriculture VII
Executive Committee VII
Ex-Officio Members VII
Members VII
Cattle, Number and Value by Counties 412-414
Cereal Crops of the United States 416
Contributors—
Addy, E. F., Parnell, Missouri 390
Addy, W. L., Parnell, Missouri 285
Atwood, G. A., Springfield, Missouri 73
Bothwell, Hon. J. H., Sedalia, Missouri 288
Canaday, J. C., Bogard, Missouri 92
Carrington, Hon. W. T., Jefferson City, Missouri 49
Carroll, Hon. M. V., Jefferson City, Missouri 300
Chenoweth, J. H., Lathrop, Missouri 67
Child, Col. A. J., St. Louis, Missouri 239
Clark, Col. R. C., Fayette, Missouri 169
Clark, Hon. C. F., Mexico, Missouri 138
Cobb, E. N., Monmouth, Illinois 363
Colman, Hon. N. J., St. Louis, Missouri 181
Connaway, Dr. J. W., Columbia, Missouri 217
Dugan, Mrs. George E., Sedalia, Missouri 357
Erwin, J. O., Steedman, Missouri 383
Finley, R. J., Macon, Missouri 155
Glasscock, Hopson, Rensselear, Missouri 269
Hamilton, George W., Fulton, Missouri 253
Harbaugh, R. L., Liberty, Missouri 387
Jesse, Dr. R. H., Columbia, Missouri 81
Kirk, Prof. J. R., Kirksville, Missouri 54
Luckey, Dr. D. F., Columbia, Missouri 94
McAlester, Dr. A. W., Columbia, Missouri 143
McDairmaid, John, Des Moines, Iowa 210
McKay, Prof. G. L., Ames, Iowa 341
Maitland, Hon. Alex., Richmond, Missouri 287
Marple, W. W., Kansas City, Missouri 333
Maxwell, Mrs. Della, Fayette, Missouri 161
Muir, J. E., Hatton, Missouri 267
Murray, Hon. N. F., Oregon, Missouri 62, 64
Opel, Chas., Jefferson City, Missouri 86
Otis, Prof. D. H., Manhattan, Kansas 348
Patterson, John, Kirksville, Missouri 70
Raine, C. O., Monticello, Missouri 89, 108
Rippey, Hon. J. R., Sedalia, Missouri 5-48
Schaal, Mary, Lexington, Missouri 153
Shattuck, L. E., Stanberry, Missouri 252
Starr, J. H., Centralia, Missouri 244

Stedman, Prof. J. M., Columbia, Missouri 59
Steinmesch, Henry, St. Louis, Missouri 159
Stevens, W. A., Garden City, Missouri 367
Walker, A. W., Fayette, Missouri 84
Wallace, Hon. D. D., New London, Missouri 295
Waters, Hon. G. W., Canton, Missouri 90, 118, 272
Waters, H. J., Columbia, Missouri 192, 323, 329
White, Dr. T. E., Sedalia, Missouri 258
Whitten, Prof. J. C., Columbia, Missouri 57
Williams, George W., Humansville, Missouri 215
Willoughby, C. L., Columbia, Missouri 311
Zabriskie, Miss J. A. L., Columbia, Missouri..... 113
Dairy Herd, The (Prof. H. J. Waters)..... 323
Dairy Herd, Feeding, The (Prof. H. J. Waters) 329
Farm Animals, United States, Number and Value of..... 415
Farmers' Institutes 49
Commercial Fruit Growing (N. F. Murray) 62
Dairying in Missouri (John Patterson) 70
Farmers' Orchard and Fruit Garden, The (N. F. Murray)..... 64
Industrial Education (Prof. J. R. Kirk)..... 54
Nature Study and Practical Agriculture in Rural Schools (Hon. W. T. Carrington) 49
Need of Pure Food Legislation (G. A. Atwood)..... 73
New Remedies for Biting Insects (Prof. J. M. Stedman)..... 59
Organized Wealth a Menace (Dr. R. H. Jesse) 81
Planting and Management of an Orchard (Prof. Whitten)..... 57
Soy Beans and Cow Peas (J. H. Chenoweth) 67
Hogs, Number and Value by Counties 412-414
Horses, Number and Value by Counties 412-414
Introductory..... 1
Land, Number of Acres and Valuation by Counties 412-414
Letter of Transmittal X
Live Stock Sanitary Regulations 394
Cattle Quarantine Proclamation—Southern Fever..... 395
Duties of Live Stock Inspectors..... 402
Proclamation Rescinding Tuberculosis Regulation 398
Report of Dr. E. M. Hendy, 1900 407
Report of Dr. R. B. Love, 1900..... 407
Report of Dr. D. F. Luckey, First Quarter 404
Report of Dr. D. F. Luckey, Second Quarter 405
Report of Dr. D. F. Luckey, Third and Fourth Quarters..... 406
Report of Dr. T. E. White, First Quarter 404
Resolutions Adopted by the Central Shorthorn Breeders of America..... 399
State Veterinary Service 401
Sheep Quarantine Regulations—Scabies 400
Manufacturing and Marketing Farm Butter (C. L. Willoughby)..... 311
Missouri Agricultural College, The 371
Missouri Improved Live Stock Breeders' Association..... 181
Alfalfa Clover (Geo. W. Williams) 215
Experiments in Wintering and Fattening Steers (Prof. Waters)..... 192
Immunizing Pure-Berd Cattle Against Texas Fever for the Southern Market (Dr. J. W. Connaway) 217

Missouri's Peculiar Advantages and her Future for Development of Improved Stock (J. McDairmaid, Des Moines, Iowa) 210
The State Fair as an Educational Factor (Hon. N. J. Coleman) 181
Missouri Improved Live Stock Breeders' Association, Officers of IX
Missouri Horse Breeders' Association 138
Encouragement to the Horse Industry (Dr. McAlester) 143
The Horse Breeding Industry (Hon. C. F. Clark) 138
Missouri Horse Breeders' Association, Officers of IX
Missouri State Grange 107
Annual Address to State Grange (C. O. Raine) 108
Choosing a Profession (Col. G. W. Waters) 118
Household Economics (Miss J. A. L. Zabriskie) 113
Missouri State Grange, Officers of IX
Missouri State Poultry Association, Institute Meeting of 149
Future of the Belgian Hare (R. J. Finley) 155
Missouri State Fair, The (Col. R. C. Clark) 169
Poultry at the State Fair (Mrs. Della Maxwell) 161
Show Room as an Educator, The (H. Steinmesch) 159
The White Holland Turkey (Mary Schaal) 153
Missouri State Poultry Association, Officers of VIII
Missouri Swine Breeders' Association 84
Address of Welcome (A. W. Walker) 84
President's Address (J. C. Canaday) 92
Prevention and Extirpation of Hog Cholera (D. F. Luckey) 94
Response for Good Roads Association (Col. G. W. Waters) 90
Response for State Grange (C. O. Raine) 89
Response for Poultry Association (Chas. Opel) 86
Missouri Swine Breeders' Association, Officers of VIII
Mules, Number and Value by Counties 412-414
Prize Essays on Profitable Beef Making 383
I (J. O. Erwin) 383
II (R. L. Harbaugh) 387
III (E. F. Addy) 390
Report of County Agricultural and Mechanical Societies 408-409
Report of Mutual Insurance Companies 410-411
Report of Secretary 5
Cattle Quarantine Regulations 15
Conclusion 26
Conditions of Enforcement Anti-Butterine Laws, Kansas City 20
Crop Conditions and Yields, 1900 6
Election of Officers 32
Enforcement of Anti-Butterine Laws 18
Farmers' Institutes 9
Industrial Meeting 14
Louisiana Purchase Exposition 23
Report Agricultural College Committee 27
Report of Auditing Committee 31
Report of Committee on Resolutions 33
State Board of Agriculture 33
State Fair 24
State Fair Directory 32
State Fair Treasurer's Report 48
Secretary's Financial Statement 35

Skim Milk Cheese Law 22
Special Institute Meetings 13
Summary of Financial Statement 43
Treasurer's Report 45
Tuberculosis Regulations 16
Road Improvement Association 272
Experience in Road Building in Ralls County (Hon. D. D. Wallace)..... 295
Improvement of Roads, The (Hon. J. H. Bothwell)..... 288
Our New Road Law and Necessary Amendments (W. L. Addy)..... 285
Poll Tax Under the Present Law (Hon. A. Maitland) 287
Report of Secretary (Col. G. W. Waters)..... 272
Road Drainage (Hon. M. V. Carroll) 309
Road Improvement Association, Officers of IX
State Dairy Association 333
Cheese Making on the Farm (W. A. Stevens)..... 367
Educating Dairymen (Prof. G. L. McKay) 341
Scrub Cows and Scrub Dairymen (Prof. D. H. Otis) 348
Silos and Ensilage (E. N. Cobb) 363
The Poetry of Butter Making (Mrs. G. E. Dugan)..... 357
What Should Persons Know (W. W. Marple) 333
State Dairy Association, Officers of. IX
State Fair Directory, Executive Committee VIII
State Fair Directory, Officers of VIII
State Horticultural Society, Officers of VIII
State Sheep Breeders' Association 239
A Veterinarian's Experience with Sheep Diseases (Dr. T. E. White)..... 258
Breeders' Experience (Hopson Glasscock) 269
Future of the Merino Sheep (L. E. Shattuck) 252
Prejudice in Missouri Against Merinos, The (G. W. Hamilton)..... 253
Sheep and Wool from the Standpoint of a Commission Man and Breeder (Col. A. J. Child) 239
Sheep Feeding in Missouri (J. H. Starr) 244
Stomach Worms in Lambs (J. E. Muir)..... 267
State Sheep Breeders' Association, Officers of..... IX
Status of the Dairy Industry in Missouri in 1900..... 308
Sheep, Number and Value by Counties.....412, 414
Table of Contents XI